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Patent and Trademark Office

SEARCH REQUEST FORM 34998

Examiner # (Mandatory): 77218 Requester's Full Name: Brian Pellegrino

Art Unit 3738 Location (Bldg/Room#): CP2 2D20 Phone (circle 305 306 308) 5899

Serial Number: 09494240 Results Format Preferred (circle): PAPER DISK E-MAIL

Title of Invention: Diamond Surfaced femoral head for use in a prosthetic joint

Inventors (please provide full names): Bill J Pope, Jeffery K Taylor, Richard H. Dixon, Clayton F. Gardinier, Lewis M Pope, Dean C. Blackburn, Michael A. Vail, Kenneth M. Jensen

Earliest Priority Date: 1/30/00

Keywords (include any known synonyms registry numbers, explanation of initialisms):

- femoral head
- polycrystalline diamond compact
- sintering
- bonding to substrates metal to metal diamond to metal
- solvent-catalyst
- bearing and articulation surfaces
- polished - heat during joining

anything in binder bonding d is in solvent-catalyst group

→ ball and cup socket joint

Search Topic:

Please write detailed statement of the search topic, and the concept of the invention. Describe as specifically as possible the subject matter to be searched. Define any terms that may have a special meaning. Give examples of relevant citations, authors, etc., if known. You may include a copy of the abstract and the broadcast or most relevant claim(s).

Abstract – prosthetic joints, components for prosthetic joints, superhard bearing and articulation surfaces, diamond bearing and articulation surfaces, substrate > surface topographical features, materials, for making joints, bearing and articulation surfaces, and methods for manufacturing and finishing the same, and related information are disclosed, including a diamond-surfaced femoral head for use in a prosthetic joint.

rough vs smooth waves ridges grooves

Summary – provide a prosthetic joint that does not shed significant amounts of debris or wear particles as a result of use or wear. Form an articulating surface that results in a low friction and is long lasting. Lessen the risk of osteolysis.

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Searcher: JEANNE HORRIGAN

Searcher Phone #: 305-5934

Searcher Location: CP2-2008

Date Picked Up: 2/7

Date Completed: 2/7

Clerical Prep Time: 57

Terminal Time: 83

Number of Databases:

Type of Search

- ___ N.A. Sequence
- ___ A.A. Sequence
- ___ Structure (#)
- ✓ Bibliographic
- ___ Litigation1
- ___ Fulltext
- ___ Procurement
- ___ Other

Vendors (include cost where applicable)

- ___ STN
- ___ Questel/Orbit
- ___ Lexis/Nexis
- ___ WWW/Internet
- ___ In-house sequence systems (list)
- ✓ Dialog
- ___ Dr. Link
- ___ Westlaw
- ___ Other (specify)

bowget diamond to bond polycrystalline ~~diamon~~

PTO-1590 (2-99)

February 7, 2001

TO: Brian Pellegrino, CP2, Room 2D20
FROM: Jeanne Horrigan, EIC-3700
SUBJECT: Search Results for Serial #09/494240

Attached are the search results for "Diamond-surfaced Femoral Head for Use in a Prosthetic Joint ," including results of an inventor search in foreign patent databases; and prior art searches in foreign patent and sci/tech/med/metals/materials bibliographic and full text databases.

I first searched bibliographic databases, where I found a lot on amorphous diamonds and diamond-like materials. When I searched the full-text databases, I revised the search strategy to focus on polycrystalline diamonds, not amorphous diamonds or diamond like materials. If the amorphous diamonds and/or diamond like materials are relevant, please let me know and I will be happy to expand the search in the full text databases to these items as well.

There was a lot of material in all the databases on how to add a diamond coating or surface to another material. I was not sure which of these were relevant. I only tagged items that discussed the use of diamonds in prosthetics. However, I recommend that you review all of the results.

I hope these results are useful. Please let me know if you would like me to expand or modify the search or if you have any questions.

File 350:Derwent WPIX 1963-2000/UD,UM &UP=200107
File 344:CHINESE PATENTS ABS APR 1985-2001/JAN
File 347:JAPIO Oct 1976-2000/Jul(UPDATED 001114)
File 371:French Patents 1961-2000/BOPI 0052

Set	Items	Description
S1	31686	DIAMOND? ?
S2	16599	FEMORAL()HEAD OR PROSTHES? OR PROSTHET?
S3	268511	JOINT? ? OR BOALL(2N)SOCKET
S4	174549	WEAR OR DEBRIS
S5	22125	ERODE? ? OR ERODING OR EROSION
S6	287286	FRICTION OR ABRASION OR FATIGUE
S7	190949	CORROSI? OR CORROD? OR SPALL?
S8	3651383	SURFACE? ? OR COAT? ? OR COATING OR COATED
S9	474571	BOND OR BONDS OR BONDED OR BONDING
S10	338501	JOIN OR JOINS OR JOINED OR JOINING
S11	4094	BALL(2N)SOCKET
S12	263	S1(S)(S2 OR S3 OR S11)
S13	55	S12 AND S4:S7
S14	35	S1(S)S8 AND S13
S15	35	IDPAT (sorted in duplicate/non-duplicate order)
S16	**35**	**IDPAT (primary/non-duplicate records only)**

16/TI/1 (Item 1 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Retaining screw with abutment and jawbone implant useful in dental implantology, comprises hard carbon coated head with seating communicates with shank, cavity receives tool and threads engaged with implant socket

16/TI/2 (Item 2 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Rotating cutting tool, e.g. a dental grinding tool, has a chromium nitride layer covering a coating of diamond grains embedded in a nickel layer

16/TI/3 (Item 3 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Very smooth contact surface for ultra-high molecular weight polyethylene implantable prosthetic joint or bone component is made using a diamond cutting tool with a diamond radiused to provide a precise contact point

16/TI/6 (Item 6 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Surface treatment for titanium alloys which are to be bonded with an organic adhesive to form laminates and joints

16/TI/8 (Item 8 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Unit for application of wear resistant coatings - has blocking unit, bath containing liquid organometallic compound and detonation diamond powder

16/TI/9 (Item 9 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Application of friction surface on implanted prosthesis component - uses thin layer of crystalline material applied in vapour form to hardened under-surface

16/TI/10 (Item 10 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
File for forming bone tunnel for ligament prosthesis - is made from

coiled elastic wire alternating coils of different diameters and with outer abrasive diamond coating on some groups of coils

16/TI/16 (Item 16 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Decorating member - has sintered diamond jointed in a layer-structure on the base material surface of cemented carbide

16/TI/17 (Item 17 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Mfr. and assembly of dental probes having improved corrosion resistance - includes vacuum annealing stainless spring steel tool blade to improve impact strength

16/TI/20 (Item 20 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Sliding ring seal - with revolving ring attracted to stationary ring by magnetic forces

16/TI/22 (Item 22 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Solid lubricating film comprising hard carbon and silicon - has high hardness and is used for motor seal, cutting tool, etc.

16/TI/23 (Item 23 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Heat resistant flexible diamond abrasive band or disc - having polyester cloth backing laminated to mesh material carrying electro-deposited nickel contg. powdered diamond

16/TI/24 (Item 24 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Running-in of gear connection - by preliminary processing of sample using diamond-faced instrument and final processing by counter-sample

16/TI/27 (Item 27 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Diamond abrasive finishing method - producing microrelief with geometrical structure which improves service properties

16/TI/28 (Item 28 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Abrasive body comprises diamond or cubic boron nitride - bonded with high melting metal which wets the abrasive

16/TI/31 (Item 31 from file: 347)
DIALOG(R)File 347:(c) 2000 JPO & JAPIO. All rts. reserv.
ENDOSCOPE APPARATUS

16/7/4 (Item 4 from file: 350)
DIALOG(R)File 350:Derwent WPIX
(c) 2001 Derwent Info Ltd. All rts. reserv.
013087541 **Image available**
WPI Acc No: 2000-259413/200023
Knee prosthesis with femoral component and tibial components having articulating surfaces of metal, ceramic material, glass, diamond or a diamond like material
Patent Assignee: CORIN MEDICAL LTD (CORI-N); CORIN LTD (CORI-N)

Inventor: GIBSON P J; KRIKLER S J; PALING I H
Number of Countries: 001 Number of Patents: 002
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
GB 2341803	A	20000329	GB 9820692	A	19980924	200023	B
GB 2341803	B	20001025	GB 9820692	A	19980924	200055	

Priority Applications (No Type Date): GB 9820692 A 19980924
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
GB 2341803	A		14	A61L-027/02	
GB 2341803	B			A61L-027/02	

Abstract (Basic): GB 2341803 A

NOVELTY - A knee prosthesis comprises a femoral component (11) and a tibial component (12). The femoral component and the tibial component have articulating surfaces of metal, ceramic material, glass, diamond or a diamond like material. Preferably, the tibial component comprises a fixed part (15) and a separate meniscal part (16) movable relative to the fixed part.

DETAILED DESCRIPTION - Inter-engaging bollards are provided between the meniscal part and the fixed part of the tibial component to allow only limited anterior-posterior, medial-lateral and rotational movement. The articulating surfaces of the femoral and tibial component are made to a sphericity of at least 10 microns, and out of high carbon chromium alloy material. At least some of the bone-contacting surfaces of the femoral and tibial components have a porous coating e.g. Hydroxy apatite coating, or are textured.

USE - As a knee prosthesis.

ADVANTAGE - There is much less abrasion than when polyethylene components are used which used to lead to osteolysis problems.

DESCRIPTION OF DRAWING(S) - The figure shows a side cross section of the prosthesis.

femoral component (11)
tibial component (12)
fixed part of the tibial component (15)
separate meniscal part (16)
pp; 14 DwgNo 1/4

Derwent Class: D22; L02; M13; P32; P34
International Patent Class (Main): A61L-027/02
International Patent Class (Additional): A61F-002/38; A61L-027/04; A61L-027/08; A61L-027/10

16/7/5 (Item 5 from file: 350)
DIALOG(R)File 350:Derwent WPIX

013033692 **Image available**
WPI Acc No: 2000-205543/200018
Orthodontic archwire for use in correcting misaligned or protruding teeth includes the use of diamond-like carbon as an abrasion resistant barrier coating to inhibit the leaching of toxic components
Patent Assignee: ANSON MEDICAL LTD (ANSO-N)
Inventor: ANSON A W
Number of Countries: 022 Number of Patents: 002
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
WO 200007516	A2	20000217	WO 99GB2543	A	19990803	200018	B
AU 9951833	A	20000228	AU 9951833	A	19990803	200030	

Priority Applications (No Type Date): GB 9816803 A 19980803

Patent Details:
Patent No Kind Lan Pg   Main IPC   Filing Notes
WO 200007516 A2 E   9 A61C-007/20
   Designated States (National): AU JP KR US
   Designated States (Regional): AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE
AU 9951833   A   A61C-007/20   Based on patent WO 200007516
Abstract (Basic): WO 200007516 A2
        NOVELTY - The orthodontic archwire (1) is coated with a diamond -like carbon and attached to the rear teeth (4) using brackets (2) with a tensioning element. At least one of the bracket and tensioning element has a surface finish on the RA scale of 0.01-0.5 microns.
        USE - The device is used for correcting misaligned, protruding or unevenly spaced teeth.
        ADVANTAGE - The use of diamond -like carbon as an abrasion and diffusion barrier coating to the orthodontic archwire reduces wear and prevents the leaching of toxic materials from prostheses to the organism. The number of visits to an orthodontist to re-tension the archwires is reduced.
        DESCRIPTION OF DRAWING(S) - The figure shows a section of a tooth.
        Archwire (1)
        Guiding bracket (2)
        Tooth (4)
        pp; 9 DwgNo 2/3
Derwent Class: D21; P32
International Patent Class (Main): A61C-007/20
International Patent Class (Additional): A61K-006/04

 16/7/11   (Item 11 from file: 350)
DIALOG(R)File 350:Derwent WPIX
(c) 2001 Derwent Info Ltd. All rts. reserv.
010642456   **Image available**
WPI Acc No: 1996-139410/199614
   Prosthetic joint with surfaces coated with polished polycrystalline diamond - formed by different methods on abutting surfaces for reduced friction and person
Patent Assignee: US SYNTHETIC (USSY-N); DIAMICRON INC (DIAM-N)
Inventor: GARRICK R M; POPE B J
Number of Countries: 053 Number of Patents: 006
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
WO 9604862	A1	19960222	WO 94US12755	A	19941102	199614	B
AU 9510506	A	19960307	AU 9510506	A	19941102	199624	
EP 774931	A1	19970528	WO 94US12755	A	19941102	199726	
			EP 95901155	A	19941102		
US 5645601	A	19970708	US 94289696	A	19940812	199733	
			US 96631877	A	19960416		
JP 10503951	W	19980414	WO 94US12755	A	19941102	199825	
			JP 96507269	A	19941102		
US 6010533	A	20000104	US 96631877	A	19960416	200008	
			US 97844395	A	19970418		

Priority Applications (No Type Date): US 94289696 A 19940812; US 96631877 A 19960416; US 97844395 A 19970418
Cited Patents: 5082359
Patent Details:
Patent No Kind Lan Pg   Main IPC   Filing Notes
WO 9604862   A1 E 15 A61C-003/00

Designated States (National): AT AU BB BG BR BY CA CH CZ DE DK ES FI GB GE HU JP KE KG KP KR KZ LK LT LU MD MG MN MW NL NO NZ PL PT RO RU SD SE SI SK TJ TT UA VN
Designated States (Regional): AT BE CH DE DK ES FR GB GR IE IT LU MC NL OA PT SE

US 6010533 A A61F-002/34 Cont of application US 96631877
Cont of patent US 5645601
AU 9510506 A A61C-003/00 Based on patent WO 9604862
EP 774931 A1 E A61C-003/00 Based on patent WO 9604862
Designated States (Regional): AT BE CH DE DK ES FR GB GR IE IT LI LU MC NL PT SE
US 5645601 A 6 A61F-002/30 Cont of application US 94289696
JP 10503951 W 17 A61F-002/30 Based on patent WO 9604862

Abstract (Basic): WO 9604862 A

Interfaces of load-bearing areas (146,136) of prosthetic joint , e.g. hip joint , are coated with thin layers (150,158) of polished polycrystalline diamond , in which diamond crystals have a common dia. range of pref. less than 100mm, esp. 0.001-1mm.

Pref., thickness of layer is less than 1000mm, pref. less than 1mm. Diamond compact is coated on the surfaces by a method selected from sintering, high temp. laser, chemical vapour deposition, electroplating and forming a matrix of high molecular wt. polyethylene.

ADVANTAGE - Significantly decreases load-bearing surface erosion and debris .

Dwg.2/2

Abstract (Equivalent): US 5645601 A

A prosthetic joint comprising: a pair of load-bearing surfaces forming the joint and disposed in sliding engagement relative to each other; and coating means disposed on each of the load-bearing surfaces to contact the coating means on the other load-bearing surface to facilitate sliding therebetween, the coating means comprising polycrystalline diamond .

Dwg.2/2a

Derwent Class: A96; D22; L02; M11; M13; P32; P61
International Patent Class (Main): A61C-003/00; A61F-002/30; A61F-002/34
International Patent Class (Additional): A61F-002/28; A61F-002/32; A61F-002/38; A61L-027/00; B24D-003/02; C23C-016/18

16/7/13 (Item 13 from file: 350)
DIALOG(R)File 350:Derwent WPIX

010382298
WPI Acc No: 1995-283612/199537

Coated femoral stem prosthesis used in hip arthroplasty - is specifically designed to reduce bonding with bone cement by coating it with an adhesive reducing compsn. e.g. diamond-like carbon

Patent Assignee: HOWMEDICA INC (HOWN); STRYKER TECHNOLOGIES CORP (STRY-N)
Inventor: HIGHAM P A; WARFIELD L T; HIGHAN P A
Number of Countries: 026 Number of Patents: 014
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
WO 9520982	A1	19950810	WO 95IB38	A	19950118	199537	B
AU 9513266	A	19950821	AU 9513266	A	19950118	199547	
ZA 9500738	A	19960925	ZA 95738	A	19950131	199643	
DE 29580466	U1	19961002	DE 95U2080466	U	19950118	199645	
			WO 95IB38	A	19950118		
EP 741584	A1	19961113	EP 95904683	A	19950118	199650	

			WO 95IB38	A	19950118	
US 5593452	A	19970114	US 94189629	A	19940201	199709
			US 95503572	A	19950718	
JP 9501860	W	19970225	JP 95520481	A	19950118	199718
			WO 95IB38	A	19950118	
AU 677751	B	19970501	AU 9513266	A	19950118	199726
KR 97700520	A	19970212	WO 95IB38	A	19950118	199809
			KR 96704133	A	19960731	
NZ 277879	A	19980325	NZ 277879	A	19950118	199818
			WO 95IB38	A	19950118	
MX 9603104	A1	19970301	MX 963104	A	19960731	199820
IL 112456	A	19980816	IL 112456	A	19950126	199840
US 5800559	A	19980901	US 94189629	A	19940201	199842
			US 95503572	A	19950718	
			US 96739090	A	19961028	
CA 2182285	C	20001114	CA 2182285	A	19950118	200063
			WO 95IB38	A	19950118	

Priority Applications (No Type Date): US 94189629 A 19940201; US 95503572 A 19950718; US 96739090 A 19961028

Cited Patents: EP 302717; EP 573694; GB 2178320; US 5171275

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
WO 9520982	A1	E	16	A61L-027/00	
Designated States (National): AU CA DE JP KR MX NZ					
Designated States (Regional): AT BE CH DE DK ES FR GB GR IE IT LU MC NL PT SE					
AU 9513266	A			A61L-027/00	Based on patent WO 9520982
ZA 9500738	A		17	A61F-000/00	
DE 29580466	U1		21	A61F-002/36	Based on patent WO 9520982
EP 741584	A1	E		A61L-027/00	Based on patent WO 9520982
Designated States (Regional): AT BE CH DE DK ES FR GB GR IE IT LI LU NL PT SE					
US 5593452	A			A61F-002/32	Cont of application US 94189629
JP 9501860	W		20	A61F-002/36	Based on patent WO 9520982
AU 677751	B			A61L-027/00	Previous Publ. patent AU 9513266 Based on patent WO 9520982
KR 97700520	A			A61L-027/00	Based on patent WO 9520982
NZ 277879	A			A61F-002/30	Based on patent WO 9520982
MX 9603104	A1			A61L-027/00	
IL 112456	A			A61F-002/32	
US 5800559	A			A61F-002/32	Cont of application US 94189629 Cont of application US 95503572 Cont of patent US 5593452
CA 2182285	C	E		A61L-027/00	Based on patent WO 9520982

Abstract (Basic): WO 9520982 A

A femoral hip joint prosthesis comprises a proximal stem portion and a distal stem portion for contact with the bone cement. The distal stem is formed from a biocompatible material having a polished surface coated with a layer of material selected from diamond -like carbon, chromium carbide, titanium nitride, titanium carbo-nitride, chromium and/or zirconium.

Also claimed is a femoral hip joint prosthesis which comprises a head and neck proximal portion and an elongated stem portion for contact with the bone cement. The stem portion extends from the proximal portion to a distal end and has medial, lateral, anterior and posterior surfaces . The stem is formed from metal having a polished surface coated with a layer of material selected from diamond -like

carbon, chromium carbide, titanium nitride, titanium carbo-nitride, chromium and/or zirconium.

USE - Used in hip arthroplasty.

ADVANTAGE - The femoral hip joint prosthesis is specifically designed to reduce the bond between the prosthesis and the bone cement by coating the former with an adhesive reducing compsn. Advantageously, the femoral hip joint prosthesis will self-tighten even though the cement mantle creeps or expands fractionally over a period of time. The prosthesis gives superior results when compared with current methods. It allows for enhanced subsidence within the cement mantle and exhibits good corrosion resistance when implanted in the body.

Dwg.0/6

Abstract (Equivalent): US 5593452 A

A method for implanting a femoral hip joint prosthesis having a reduced adhesion to bone cement in an intramedullary canal comprising the steps of:

providing a prosthesis having an elongated stem extending from a proximal end to a distal end, said stem tapering from a relatively larger cross-sectional size adjacent said proximal end to a smaller cross-sectional size adjacent said distal end and being formed of a biocompatible metal alloy and having substantially all surfaces with a polished finish with the polished surface being coated with a layer of diamond -like carbon to reduce adhesion to bone cement, said layer of material is from about 1 to 3 microns thick with an outer surface maintaining said polished surface roughness: and

implanting said prosthesis in bone cement

Derwent Class: D22; P32; P34

International Patent Class (Main): A61F-000/00; A61F-002/30; A61F-002/32; A61F-002/36; A61L-027/00

International Patent Class (Additional): A61F-002/28

16/7/15 (Item 15 from file: 350)

DIALOG(R)File 350:Derwent WPIX

010279395 **Image available**

WPI Acc No: 1995-180652/199524

Treating carbon material to produce coating - which enables good adhesion to further diamond coating

Patent Assignee: LE CARBONE LORRAINE SA (CAOR)

Inventor: BOU P; HERBIN R; RATS D; VANDENBULCKE L

Number of Countries: 009 Number of Patents: 004

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
EP 653394	A1	19950517	EP 94420305	A	19941108	199524	B
FR 2712285	A1	19950519	FR 9313746	A	19931112	199525	
JP 7187863	A	19950725	JP 94278169	A	19941111	199538	
US 5705262	A	19980106	US 94329708	A	19941026	199808	

Priority Applications (No Type Date): FR 9313746 A 19931112

Cited Patents: 5.Jnl.Ref; DE 3026030; EP 434501; EP 492436; JP 1201478; JP 3159977; JP 6002139; RO 2006538

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
EP 653394	A1	F	6	C04B-041/89	
Designated States (Regional): DE ES GB IE IT SE					
FR 2712285	A1		19	C04B-041/50	
JP 7187863	A		7	C04B-041/87	
US 5705262	A		9	C23C-016/32	

Abstract (Basic): EP 653394 A

A carbon substrate is pretreated to produce a SiC layer by thermochemical conversion of the carbon with a reactive material containing Si. The reactive material may be Si itself or a Si precursor. It is heated to above the Si melting point or above the reaction temp. of the precursor with the carbon. The reactive material may form an intermediate reactive gas containing Si.

USE - Diamond coating friction joints , bearings, or steel tools which require wear resistant coatings.

ADVANTAGE - Enables good adhesion of diamond to the substrate of esp. large objects.

Dwg.1/5

Abstract (Equivalent): US 5705262 A

A carbon substrate is pretreated to produce a SiC layer by thermochemical conversion of the carbon with a reactive material containing Si. The reactive material may be Si itself or a Si precursor. It is heated to above the Si melting point or above the reaction temp. of the precursor with the carbon. The reactive material may form an intermediate reactive gas containing Si.

USE - Diamond coating friction joints , bearings, or steel tools which require wear resistant coatings.

ADVANTAGE - Enables good adhesion of diamond to the substrate of esp. large objects.

Dwg.1/5B

Derwent Class: E36; L02; M13

International Patent Class (Main): C04B-041/50; C04B-041/87; C04B-041/89; C23C-016/32

International Patent Class (Additional): C04B-035/52; C23C-010/08; C23C-010/34; C23C-010/44; C23C-016/02; C23C-016/26; F16C-033/16

16/7/18 (Item 18 from file: 350)

DIALOG(R)File 350:Derwent WPIX

009185793

WPI Acc No: 1992-313230/199238

Diamond coated material for use as artificial joint - comprises diamond or diamond-type carbon@ coated substrate composed of ceramic, polymer or ceramic-polymer mixt.

Patent Assignee: SUMITOMO ELECTRIC CO (SUME)

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
JP 4220261	A	19920811	JP 90412205	A	19901219	199238	B

Priority Applications (No Type Date): JP 90412205 A 19901219

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
JP 4220261	A		3	A61L-027/00	

Abstract (Basic): JP 4220261 A

The material comprises substrate composed of metal or ceramic, part of which is adhered to polymer cpd. having high m.pt. or all of which is coated with the polymer, or substrate composed only of the polymer, whereby a part or all of the surface of the substrate is coated with diamond or diamond -type carbon.

Pref., the polymer includes silicone rubber and fluorine rubber. The diamond or diamond-type carbon layer is formed by gas phase synthetic method using starting gases capable of supplying halogen atom, carbon atom and hydrogen atom at 200 to 900 deg.C. Suitable metal

is titanium, aluminum, stellite, or aluminum alloy, etc.

USE/ADVANTAGE - The material has smooth surface, high affinity to living creatures and high abrasion resistance, and thus can be used as artificial joint, et

Dwg.0/0

Derwent Class: A96; D22; L02; M13; P32; P34
International Patent Class (Main): A61L-027/00
International Patent Class (Additional): A61C-008/00

16/7/19 (Item 19 from file: 350)
DIALOG(R)File 350:Derwent WPIX

009149017 **Image available**
WPI Acc No: 1992-276456/199233
Load-bearing plastic orthopaedic joint implant - has improved wear characteristics due to surface ion implantation
Patent Assignee: SPIRE CORP (SPIR-N)
Inventor: OLIVER R W; SIOSHANSI P
Number of Countries: 001 Number of Patents: 001
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
US 5133757	A	19920728	US 90560837	A	19900731	199233	B

Priority Applications (No Type Date): US 90560837 A 19900731
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 5133757	A		9	A61F-002/30	

Abstract (Basic): US 5133757 A

A load-bearing plastic orthopaedic joint implant is formed from an ultra high molecular wt. polyethylene (UHMWPE) or high density polyethylene (HDPE) material. The implant is mounted in a chamber in which a vacuum of 0.00001 torr is created. A surface of the implant is exposed to an ion beam to improve its surface characteristics, esp. by increasing the carbon to carbon bonds with diamond -like chain scission in the exposed surface . The chamber is backfilled with an inert gas to about atmospheric pressure. The backfilling is maintained for 1-5 hrs. to effect formation of the carbon to carbon bonds.

Pref. the implant is heated prior to exposing its surface to the ion beam. After removal from the treatment chamber, the implant is sterilised by gamma rays. During treatment the exposed surface is implanted with an atomic concn. of 0.01-2% of the ion beam. The depth of penetration of the implanted ion species is about 0.25 micron after exposure to the beam for about 1 hr. During implantation, the current density on the surface is 1.25 microamps/sq.cm. The resulting surface has increased density and microhardness, decreased surface energy rendering it more hydrophobic and increased resistance to chemical attack.

USE/ADVANTAGE - The implant has improved wear characteristics.

Dwg.4/12

Derwent Class: A17; A35; A96; D22; P32
International Patent Class (Main): A61F-002/30

16/7/35 (Item 35 from file: 347)
DIALOG(R)File 347:JAPIO

01642587 **Image available**
PRODUCTION OF WEAR RESISTANT MEMBER
PUB. NO.: 60-121087 [JP 60121087 A]

PUBLISHED: June 28, 1985 (19850628)
INVENTOR(s): SHIROKANE MAKOTO
NAKABASHI MASAKO
YAMAZAKI TATSUO
APPLICANT(s): TOSHIBA CORP [000307] (A Japanese Company or Corporation), JP (Japan)
APPL. NO.: 58-229164 [JP 83229164]
FILED: December 06, 1983 (19831206)

ABSTRACT

PURPOSE: To obtain a wear resistant member which has substantial joint strength and withstands high temperature by subjecting the members formed with boriding layers on the joint surfaces consisting of a sintered hard alloy, etc. to liquid- phase diffusion joining.
CONSTITUTION: The joint surfaces 2, 2' of joint members 1, 3 consisting of a sintered hard alloy are polished by diamond and are thereafter subjected to a boriding treatment by using an electric field bath of sodium borate for a platinum anode. The deposits, etc. on the surface 2 are removed and after the surface is degreased and cleaned, the joint surfaces are maintained for required time under and at prescribed pressure and temperature in a hot press. The joint parts 2, 2' are subjected to liquid-phase diffusion in the continuous state of carbide, by which secure joining is accomplished.

File 348:EUROPEAN PATENTS 1978-2000/Jan W04
File 349:PCT Fulltext 1983-2001/UB=20010201, UT=20010118

Set	Items	Description
S1	19425	DIAMOND? ?
S2	9081	POLYCRYSTALLINE
S3	11074	PROSTHE?
S4	102809	JOINT? ?
S5	13541	HIP OR KNEE
S6	3040	FEMORAL()HEAD OR BALL(2N)SOCKET
S7	58953	WEAR
S8	23068	DEBRIS
S9	14461	ERODE? ? OR EROSION OR ERODING
S10	81678	FRICTION
S11	24657	ABRASION
S12	16131	FATIGUE
S13	1560	SPALL?
S14	633511	SURFACE? ?
S15	46643	COAT? ?
S16	232031	COATED OR COATING? ?
S17	122394	BOND OR BONDS
S18	128178	BONDED OR BONDING
S19	34958	JOIN OR JOINS
S20	116107	JOINED OR JOINING
S21	921	S2()S1
S22	24519	S3 OR S5 OR S6
S23	19	S21 AND S22
S24	19	IDPAT (sorted in duplicate/non-duplicate order)
S25	**19**	**IDPAT (primary/non-duplicate records only)**

25/TI/1 (Item 1 from file: 348)
DIALOG(R)File 348:(c) 2001 European Patent Office. All rts. reserv.
Alumina sintered body and process for producing the same

25/TI/2 (Item 2 from file: 348)
DIALOG(R)File 348:(c) 2001 European Patent Office. All rts. reserv.
Orthopaedic wires and cables and methods of making same

25/TI/3 (Item 3 from file: 348)
DIALOG(R)File 348:(c) 2001 European Patent Office. All rts. reserv.
Rotary drill bit having movable formation-engaging members

25/TI/4 (Item 4 from file: 348)
DIALOG(R)File 348:(c) 2001 European Patent Office. All rts. reserv.
Earth-boring bit with super-hard cutting elements

25/TI/6 (Item 6 from file: 348)
DIALOG(R)File 348:(c) 2001 European Patent Office. All rts. reserv.
Wear-resistant head for contact reading and writing magnetic media

25/TI/7 (Item 7 from file: 348)
DIALOG(R)File 348:(c) 2001 European Patent Office. All rts. reserv.
Earth boring drill bit with improved wear inserts.

25/TI/8 (Item 8 from file: 349)
DIALOG(R)File 349:(c) 2001 WIPO/MicroPat. All rts. reserv.
ROTARY-TYPE EARTH BORING DRILL BIT, MODULAR BEARING PADS THEREFOR AND METHODS

25/TI/9 (Item 9 from file: 349)
DIALOG(R)File 349:(c) 2001 WIPO/MicroPat. All rts. reserv.
METHOD OF MANUFACTURING A DIAMOND COMPOSITE AND A COMPOSITE PRODUCED BY SAME

25/TI/14 (Item 14 from file: 349)
DIALOG(R)File 349:(c) 2001 WIPO/MicroPat. All rts. reserv.
WHIPSTOCK APPARATUS AND METHODS OF USE

25/TI/18 (Item 18 from file: 349)
DIALOG(R)File 349:(c) 2001 WIPO/MicroPat. All rts. reserv.
METHOD FOR DIRECTING AN ELONGATED FLOW OF COATING MATERIALS TOWARD A SUBSTRATE

25/TI/19 (Item 19 from file: 349)
DIALOG(R)File 349:(c) 2001 WIPO/MicroPat. All rts. reserv.
DIAMOND PRODUCTION

25/3,AB/5 (Item 5 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS
(c) 2001 European Patent Office. All rts. reserv.
00637075
Article comprising polycrystalline diamond, and method of shaping the diamond.
Gegenstand mit polykristallinem Diamant, und Verfahren zum Formen eines Diamants.
Article comprenant du diamant polycristallin, et procede de faconnage dudit diamant.
PATENT ASSIGNEE:
AT&T Corp., (589370), 32 Avenue of the Americas, New York, NY 10013-2412, (US), (applicant designated states: DE;FR;GB)
INVENTOR:
Graebner, John Edwin, 41 Fifth Avenue, New York, New York 10003, (US)
Jin, Sungho, 145 Skyline Drive, Millington, New Jersey 07946, (US)
Wolfe, Raymond, 21 Walker Drive, New Providence, New Jersey 07974, (US)
LEGAL REPRESENTATIVE:
Johnston, Kenneth Graham et al (32381), AT&T (UK) Ltd. 5 Mornington Road, Woodford Green Essex, IG8 OTU, (GB)
PATENT (CC, No, Kind, Date): EP 618043 A1 941005 (Basic)
APPLICATION (CC, No, Date): EP 94301902 940316;
PRIORITY (CC, No, Date): US 38370 930329
DESIGNATED STATES: DE; FR; GB
INTERNATIONAL PATENT CLASS: B24D-003/00; C30B-033/00; C30B-029/04; C23C-016/56; C23C-016/26; B29D-011/00;
ABSTRACT EP 618043 A1
Disclosed is a technique that comprises selective removal of material from a surface of a polycrystalline diamond (polyD) film (e.g., 11) such that a non-planar surface results. Exemplarily the technique is used to form polyD optical elements, e.g., convex or concave lenses, or Fresnel lenses, including arrays of such lenses. The technique comprises maintaining on appropriately shaped hot template body in intimate contact with a polyD surface for a time (e.g., in the range 1 - 1000 hours) sufficient to result in formation of the desired feature in the polyD surface. The template body comprises a rare earth metal (La and Ce are preferred), Mn and/or Fe, and the temperature is below the melting temperature of the template body. Removal of "spent" template material by, e.g., chemical etching and finishing of the polyD feature, e.g., by laser ablation and/or polishing, are contemplated. (see image in original

document)
ABSTRACT WORD COUNT: 149
LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS A	(English)	EPABF2	385
SPEC A	(English)	EPABF2	2257
Total word count - document A			2642
Total word count - document B			0
Total word count - documents A + B			2642

25/3,AB/10 (Item 10 from file: 349)
DIALOG(R)File 349:PCT Fulltext

00678319
NEW CLASS OF DIAMOND-BASED MATERIALS AND TECHNIQUES FOR THEIR SYNTHESIS
NOUVELLE CLASSE DE MATIERES A STRUCTURE DE DIAMANTS ET TECHNIQUES DE SYNTHESE DE TELLES MATIERES
Patent Applicant/Assignee:
UNIVERSITA' DI ROMA TOR VERGATA, UNIVERSITA' DI ROMA "TOR VERGATA", Dipartimento Di Scienze e Tecnologie Chimiche, Via della Ricerca Scientifica, I-00133 Roma, IT
UNIVERSITA' DEGLI STUDI DI ROMA LA SAPIENZA, UNIVERSITA' DEGLI STUDI DI ROMA "LA SAPIENZA", Dipartimento Di Energitica, Piazzale Aldo Moro, 05, I-00185 Roma, IT
Inventor(s):
TERRANOVA Maria Letizia, TERRANOVA, Maria, Letizia, Universita degli Studi di Roma " La Sapienza", Via A. Scarpa, 14-16, I-00161 Roma, IT
ROSSI Marco, ROSSI, Marco, Universita di Roma "Tor Vergata", Via della Ricerca Scientifica, I-00133 Roma, IT
SESSA Vito, SESSA, Vito, , IT
PICCIRILLO Susanna, PICCIRILLO, Susanna, , IT
Patent and Priority Information (Country, Number, Date):
Patent: WO 9961371 A2 19991202
Application: WO 99EP3547 19990524 (PCT/WO EP9903547)
Priority Application: IT 98MI1159 19980526
Designated States: AE AL AM AT AU AZ BA BB BG BR BY CA CH CN CU CZ DE DK EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MD MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT UA UG US UZ VN YU ZA ZW GH GM KE LS MW SD SL SZ UG ZW AM AZ BY KG KZ MD RU TJ TM AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE BF BJ CF CG CI CM GA GN GW ML MR NE SN TD TG
Publication Language: English
Filing Language: English
Fulltext Word Count: 3796
English Abstract
Hereafter are described diamond-based composite materials consisting of sub-micrometric or nanometric dispersions of metallic elements semiconductors and their inorganic compounds in diamond- structured carbon polymorphic matrices together with the techniques and apparatus for their preparation.

25/3,AB/11 (Item 11 from file: 349)
DIALOG(R)File 349:PCT Fulltext

00561453
STRESS-FREE BONDING OF DISSIMILAR MATERIALS

ASSEMBLAGE SANS CONTRAINTE DE MATERIAUX DISSEMBLABLES
Patent Applicant/Assignee:
NORTHROP GRUMMAN CORPORATION, NORTHROP GRUMMAN CORPORATION , 1840 Century Park East - 90/110/CC, Los Angeles, CA 90067-2199 , US
Inventor(s):
HAGEDORN Fred B, HAGEDORN, Fred, B. , 1000 Cordova Drive, Orlando, FL 32804 , US
CASHION William F, CASHION, William, F. , 5071 Parkridge Court, Oviedo, FL 32765 , US
Patent and Priority Information (Country, Number, Date):
Patent: WO 9806565 A1 19980219
Application: WO 97US8541 19970522 (PCT/WO US9708541)
Priority Application: US 96696218 19960813
Designated States: JP KR AT BE CH DE DK ES FI FR GB GR IE IT LU MC NL PT SE
Publication Language: English
Filing Language: English
Fulltext Word Count: 12392
English Abstract
A process and apparatus for bonding together two layers of dissimilar material, yielding a composite structure which is substantially stress-free at a selectable reference temperature and reference isostatic pressure, which includes providing a first layer and a second layer; determining a critical line for the first layer and second layer in a pressure-temperature plane wherein a location of the critical line depends on the selectable reference temperature and reference isostatic pressure and depends on coefficients of thermal expansion and bulk moduli material constants of the first layer and the second layer, wherein the critical line sets forth a plurality of temperature-pressure pairs at which the composite structure will be substantially stress-free; controlling a temperature and an isostatic pressure during bonding such that the temperature and the isostatic pressure represent a point on the critical line; bonding the first layer and the second layer at the temperature and the isostatic pressure; and returning to the selectable reference temperature and reference isostatic pressure after bonding is completed by following a path in the pressure-temperature plane which avoids imposing disruptive stresses on the composite structure.

25/3,AB/12 (Item 12 from file: 349)
DIALOG(R)File 349:PCT Fulltext

This is a duplicate
00408846
PROSTHETIC JOINT WITH DIAMOND COATED INTERFACES
ARTICULATION PROTHETIQUE POURVUE D'INTERFACES RECOUVERTES DE DIAMANTS
Patent Applicant/Assignee:
US SYNTHETIC
Inventor(s):
POPE Bill J
GARRICK Richard M
Patent and Priority Information (Country, Number, Date):
Patent: WO 9604862 A1 19960222
Application: WO 94US12755 19941102 (PCT/WO US9412755)
Priority Application: US 94289696 19940812
Designated States: AT AU BB BG BR BY CA CH CZ DE DK ES FI GB GE HU JP KE KG KP KR KZ LK LT MG MN MW NL NO NZ PL PT RO RU SD SE SI SK TJ TT UA VN AT BE CH DE DK ES GR IE IT LU MC NL PT SE BF BJ CF CG CI CM GA GN ML MR NE SN TD TG
Publication Language: English

Fulltext Word Count: 2932
English Abstract
A prosthetic joint (108, 130) with polycrystalline diamond compact coated interfaces (150, 158) and a method for making the same are disclosed. The prosthetic joint (108, 130) has a diamond layer (150, 158) formed on at least one of the interacting, load-bearing surfaces of the joint (108, 130). The diamond layer (150, 158) adds resistance to damage from impacts and, when polished, gives the joint a low coefficient of friction, thereby increasing the life of the joint (108, 130). In accordance with one aspect of the invention, the diamond layer is formed of polycrystalline diamond compact having a common diamond particle diameter of less than 1 micron to further reduce friction.

25/3,AB/13 (Item 13 from file: 349)
DIALOG(R)File 349:PCT Fulltext

00400231
SURFACE TREATMENT TECHNIQUES
TECHNIQUES DE TRAITEMENT DE SURFACE
Patent Applicant/Assignee:
QQC INC
MISTRY Pravin
TURCHAN Manuel C
Inventor(s):
MISTRY Pravin
TURCHAN Manuel C
Patent and Priority Information (Country, Number, Date):
Patent: WO 9531584 A1 19951123
Application: WO 95US5941 19950511 (PCT/WO US9505941)
Priority Application: US 94241930 19940512
Designated States: AM AT AU BB BG BR BY CA CH CN CZ DE DK EE ES FI GB GE HU JP KE KG KP KR LR LT LU LV MD MG MN MW MX NO NZ PL PT RO RU SD SE SI SK TJ TT UA US UZ MW SD SZ UG AT BE CH DE DK ES FR GB GR IE IT LU MC NL PT SE BF BJ CF CG GA GN ML MR NE SN TD TG
Publication Language: English
Fulltext Word Count: 29595
English Abstract
Energy, such as from a UV excimer laser (712), an infrared Nd:YAG laser (714) and an infrared CO2 laser (716) is directed through a nozzle (722) at the surface of a substrate (702) to mobilize and vaporize a carbon constituent (e.g., carbide) within the substrate (e.g., steel). An additional secondary source (e.g., a carbon-containing gas, such as CO2) (720) and an inert shielding gas (e.g., N2) are also delivered through the nozzle. The vaporized constituent element is reacted by the energy to alter its physical structure (e.g., from carbon to diamond) to that of a composite material which is diffused back into the substrate as a composite material.

25/3,AB/15 (Item 15 from file: 349)
DIALOG(R)File 349:PCT Fulltext

00388883
USING LASERS TO FABRICATE COATINGS ON SUBSTRATES
EMPLOI DE LASERS POUR FABRIQUER DES REVETEMENTS SUR DES SUBSTRATS
Patent Applicant/Assignee:
QQC INC
MISTRY Pravin
TURCHAN Manuel

Inventor(s):
MISTRY Pravin
TURCHAN Manuel
Patent and Priority Information (Country, Number, Date):
Patent: WO 9520253 A2-A3 19950727
Application: WO 95US782 19950117 (PCT/WO US9500782)
Priority Application: US 94182978 19940118; US 94184041 19940121; US 94241930 19940512
Designated States: AM AT AU BB BG BR BY CA CH CN CZ DE DK EE ES FI GB GE HU JP KE KG KP KR LR LT LU LV MD MG MN MW MX NL NO NZ PL PT RO RU SD SE SI SK TJ TT UA US UZ VN KE MW SD SZ AT BE CH DE DK ES FR GB GR IE IT LU MC NL PT SE BF BJ CI CM GA GN ML MR NE SN TD TG
Publication Language: English
Fulltext Word Count: 28218
English Abstract
Laser energy is directed at a substrate to mobilize, vaporize and react a constituent (primary) element (e.g., carbon) contained within the substrate, so as to modify the composition (e.g., crystalline structure) of the constituent element, and to diffuse the modified constituent back into the substrate, as an adjunct to fabricating a coating (e.g., diamond or diamond-like carbon) on the surface of the substrate. This creates a conversion zone immediately beneath the substrate, which transitions metallurgically from the composition of the underlying substrate to a composition of the coating being fabricated on the surface of the substrate, which results in diffusion bonding of the coating to the substrate. Additional (secondary) similar (e.g., carbon) or dissimilar elements may be introduced in a reaction zone on and above the surface of the substrate to augment the fabrication of and to determine the composition of the coating. The laser energy is provided by a combination of an excimer laser, and Nd: YAG laser and a CO2 laser, the output beams of which are preferably directed through a nozzle delivering the secondary element to the reaction zone. The reaction zone is shielded by an inert (non-reactive) shielding gas (e.g., N2) delivered through the nozzle. A flat plasma is created by the lasers, constituent element and secondary element on the surface of the substrate and the flat plasma optionally extends around the edges of the substrate to fabricate a coating thereon. Pre-treatment and coating fabrication can be performed in conjunction with one another (in-situ). Alternatively, a substrate can be pre-treated to characterize its surface for subsequent coating. In either case, certain advantageous metallurgical changes are induced in the substrate due to the pre- treatment. The processes (pre-treatment and coating fabrication) are suitably performed in ambient, without preheating the substrate and without a vacuum. Substrates of numerous geometries, sizes and shapes, such as flat cutting tool inserts as well as round cutting tools, are readily coated in this manner. The lasers are directed at any suitable angle (including coaxial) relative to the substrate and/or the plasma.

25/3,AB/16 (Item 16 from file: 349)
DIALOG(R)File 349:PCT Fulltext

00336249
DIAMOND COMPACT
ELEMENT COMPRIME COMPOSE DE DIAMANTS
Patent Applicant/Assignee:
TEMPO TECHNOLOGY CORPORATION
Inventor(s):

CATALANO Joseph A
LACY Raymond B
Patent and Priority Information (Country, Number, Date):
Patent: WO 9323204 A1 19931125
Application: WO 93US4675 19930517 (PCT/WO US9304675)
Priority Application: US 92884745 19920515
Designated States: JP AT BE CH DE DK ES FR GB GR IE IT LU MC NL PT SE
Publication Language: English
Fulltext Word Count: 6428
English Abstract
A compact composed of 70 to 95 diamond or cubic boron nitride (or other superhard materials) and which is free of conventional binders, catalysts, and/or solvents and has a thermal conductivity of at least 800 watts/m°K is prepared by subjecting a body (5) consisting essentially of particulate diamond or other superhard materials (6) to a HPHT (High Pressure/High Temperature) step, in which the pressure applied to the body is substantially uniform. The diamond compact is then subjected to Chemical Vapor Deposition (CVD) of the same or different superhard material to infiltrate the interstices of the HPHT compact. The CVD coating can have up to about 2,000 watts/m°K. The compact after both the HPHT and CVD steps substantially retains the thermal and chemical properties of the superhard materials from which it is made.

25/3,AB/17 (Item 17 from file: 349)
DIALOG(R)File 349:PCT Fulltext

00318052
METHOD OF NUCLEATING DIAMOND AND ARTICLE PRODUCED THEREBY
PROCEDE DE FORMATION DE CRISTALLITES DE DIAMANT ET ARTICLE PRODUIT DE CETTE MANIERE
Patent Applicant/Assignee:
CHANG R P H
MEILUNAS Raymond J
KAPPES Manfred M
LIU Shengzhong
Inventor(s):
CHANG R P H
MEILUNAS Raymond J
KAPPES Manfred M
LIU Shengzhong
Patent and Priority Information (Country, Number, Date):
Patent: WO 9305207 A1 19930318
Application: WO 92US7439 19920903 (PCT/WO US9207439)
Priority Application: US 91753736 19910903
Designated States: CA JP KR RU US AT BE CH DE DK ES FR GB GR IE IT LU MC NL SE
Publication Language: English
Fulltext Word Count: 7986
English Abstract
Disclosed is a method of forming a diamond layer on a substrate, especially a nondiamond substrate, wherein diamond nucleation is enhanced by providing a nucleating layer comprising a fullerene or carbon cluster having a geodesic molecular structure on the substrate. The nucleating layer and a carbon-bearing plasma or other gas are then contacted under temperature and pressure conditions effective to nucleate diamond at the nucleating layer. During such contact, the substrate is negatively biased relative to the plasma to impinge positively charged ions in the plasma on the nucleating layer to promote diamond crystallite nucleation.

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File   2:INSPEC 1969-2001/Feb W1
File   6:NTIS 1964-2001/Feb W3
File   8:Ei Compendex(R) 1970-2001/Jan W2
File  31:World Surface Coatings Abs 1976-2001/Jan
File  32:METADEX(R) 1966-2001/Apr B1
File  33:Aluminium Ind Abs 1968-2001/Feb
File  34:SciSearch(R) Cited Ref Sci 1990-2001/Feb W1
File  35:Dissertation Abstracts Online 1861-2000/Dec
File  63:Transport Res(TRIS) 1970-2001/Jan
File  65:Inside Conferences 1993-2001/Feb W1
File  67:World Textiles 1968-2001/Jan
File  94:JICST-EPlus 1985-2001/Jan W3
File  96:FLUIDEX 1972-2001/Jan
File  99:Wilson Appl. Sci & Tech Abs 1983-2001/Dec
File 103:Energy SciTec 1974-2001/Jan B1
File 105:AESIS 1851-2000/Oct
File 108:AEROSPACE DATABASE 1962-2001/JAN
File 118:ICONDA-Intl Construction 1976-2001/Feb
File 119:Textile Technol.Dig. 1978-2001/Jan
File 144:Pascal 1973-2001/Feb W1
File 238:Abs. in New Tech & Eng. 1981-2001/Jan
File 240:PAPERCHEM 1967-2001/Jan W3
File 248:PIRA 1975-2001Feb W4
File 252:Packaging Sci&Tech 1982-1997/Oct
File 293:Eng Materials Abs(R) 1986-2001/Feb
File 315:ChemEng & Biotec Abs 1970-2000/Dec
File 323:RAPRA Rubber & Plastics 1972-2001/Feb
File 335:Ceramic Abstracts 1976-2000/Q4
File 369:New Scientist 1994-2001/Jan W3
File 370:Science 1996-1999/Jul W3
File 399:CA SEARCH(R) 1967-2001/UD=13406
File 434:SciSearch(R) Cited Ref Sci 1974-1989/Dec
File   5:Biosis Previews(R) 1969-2001/Jan W5
File  73:EMBASE 1974-2001/Jan  W5
File  74:Int.Pharm.Abs. 1970-2001/Jan
File  92:IHS Intl.Stds.& Specs. 1999/Nov
File 155:MEDLINE(R) 1966-2000/Dec W4
File 158:DIOGENES(R) 1976-2001/Jan W1
File 172:EMBASE Alert 2001/Feb W1
File 187:F-D-C Reports 1987-2001/Feb W1
File 188:Health Devices Sourcebook (2000)
File 198:Health Devices Alerts(R) 1977-2001/Feb W1
File 441:ESPICOM Pharm&Med DEVICE NEWS 2001/Jan W3
File 442:AMA  Journals 1982-2000/Oct B3
File 444:New England Journal of Med. 1985-2001/Feb W1
File 457:The Lancet 1986-2000/Oct W1
Set     Items   Description
S1     207363   DIAMOND? ?
S2    1954298   PROSTHE? OR JOINT? ?
S3      23154   FEMORAL()HEAD OR BALL(2N)SOCKET
S4      23824   LOAD()BEARING
S5     394327   WEAR  (January 1969)
S6      90315   DEBRIS
S7     257895   ERODE? ? OR EROSION OR ERODING
S8     390431   FRICTION  (January 1969)
S9     119623   ABRASION  (January 1969)
S10    567675   FATIGUE  (January 1969)
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S11      39068   SPALL?
S12    8135092   SURFACE? ? OR COAT? ? OR COATED OR COATING? ?
S13    1492501   BOND OR BONDS OR BONDED OR BONDING
S14     355321   JOIN OR JOINS OR JOINED OR JOINING
S15       2630   S1 AND S2:S3
S16        505   S5:S11 AND S15
S17        166   S16 AND S1(5N)S12
S18         84   RD (unique items)
S19         84   Sort S18/ALL/PY,D
S20         51   S1(S)S2:S3 AND S19
S21         51   Sort S20/ALL/PY,D
S22        351   DIAMICRON
S23          0   (S15 AND S22) NOT S20
S24         51   S15 AND S20
S25          0   S22 AND S20
S26     218637   POLYCRYSTALLINE
S27       8909   S26()S1
S28         56   S15 AND S27
S29          2   S28 AND S20
S30         54   S28 NOT S21
S31         14   S1(S)S2:S3 AND S30

21/6/1      (Item 1 from file: 32)
1239576
 Effects of diamond-like carbon coating on the wear of polyethylene.
  May 2000

21/6/3      (Item 3 from file: 2)
6565293   INSPEC Abstract Number: A2000-10-6825-010
 Title:   Friction  of  smooth  surfaces  with ultrafine particles in the
clearance
  Publication Date: March 2000
  Copyright 2000, IEE

 21/6/4      (Item 4 from file: 8)
05712047
  Title: Microcrystalline and nanocrystalline  diamond film deposition on
cobalt chrome alloy
  Conference Title: Thin Films-Stress and Machanical Properties VIII
  Publication Year: 2000

 21/6/7      (Item 7 from file: 144)
  14114448   PASCAL No.: 99-0310013
   Diamond,  diamond-like and CBN films and  coated products : A
technology and market update
 Ceramics : getting into the 2000's : Florence, 14-19 June 1998
  1999

21/6/9      (Item 9 from file: 2)
6291857   INSPEC Abstract Number: A1999-16-8770J-003
 Title: Biomaterials modification by ion-beam processing
  Publication Date: Feb. 1999
  Copyright 1999, FIZ Karlsruhe

 21/6/10      (Item 10 from file: 8)
05297463
 Title: Studies of host response to orthopedic implants and biomaterials
```

Publication Year: 1999

21/6/17 (Item 17 from file: 8)
05163991
Title: Wear of ultra-high molecular weight polyethylene against damaged and undamaged stainless steel and diamond-like carbon-coated counterfaces
Publication Year: 1998

21/6/19 (Item 19 from file: 35)
01687459 ORDER NO: NOT AVAILABLE FROM UNIVERSITY MICROFILMS INT'L.
A MULTILAYER APPROACH TO ADHERENT DIAMOND-LIKE CARBON COATINGS ON COMMERCIALLY PURE TITANIUM (CP-TI) AND TITANIUM ALLOY (TITANIUM 6-ALUMINUM 4-VANADIUM) (BIOCOMPATIBILITY, ARTIFICIAL HEART VALVE)
Year: 1998

21/6/22 (Item 22 from file: 2)
5630916 INSPEC Abstract Number: A9716-6855-048
Title: A multilayer approach to high adhesion diamond-like carbon coatings on titanium
Publication Date: April 1997

21/6/23 (Item 23 from file: 399)

Abrasion-resistant rubber products with sliding ability

21/6/24 (Item 24 from file: 315)
430286
Ultrahard carbon coatings.
Orig. Title: Ultrahartstoff-Beschichtungen aus Kohlenstoff.
PUBLICATION DATE: 1997 (970000)

21/6/27 (Item 27 from file: 8)
04486311
Title: Human monocytes stimulation by particles of hydroxyapatite, silicon carbide and diamond : in vitro studies of new prosthesis coatings
Publication Year: 1996

21/6/29 (Item 29 from file: 399)

The effect of biological fluids on the response of DLC films to a novel erosion durability test

21/6/30 (Item 30 from file: 369)
00108374 14920223.600 (USE FORMAT 7 OR 9 FOR FULLTEXT)
The mystery of the appearing diamond
March 23, 1996
WORD COUNT: 700

21/6/33 (Item 33 from file: 8)
04293699
Title: Growth continues for diamond, DLC, and CBN markets
Publication Year: 1995

21/6/34 (Item 34 from file: 399)

Hard-layer coated materials

21/6/35 (Item 35 from file: 144)
11964060 PASCAL No.: 95-0144670
The feects of diamond-like carbon coatings on macrophages, fibroblasts and osteoblast-like cells in vitro
1994

21/6/36 (Item 36 from file: 8)
04093592
Title: Effects of diamond -like carbon coatings on macrophages, fibroblasts and osteoblast-like cells in vitro
Publication Year: 1994

21/6/40 (Item 40 from file: 323)
00502992
TITLE: SURFACE MODIFICATION OF UHMWPE TO IMPROVE THE LIFETIME OF ORTHOPAEDIC IMPLANTS

21/6/41 (Item 41 from file: 323)
00421577
TITLE: DIAMOND FILMS TO PROTECT MASS MARKET PLASTICS

21/6/43 (Item 43 from file: 33)
746582
Acoustic Resonance Methods for Measuring Dynamic Elastic Modulus of Adhesive Bonds.
1990

21/6/44 (Item 44 from file: 323)
00413688
TITLE: MONSANTO AND DIAMONEX WORK TO DEVELOP DIAMOND COATINGS FOR PLASTICS

21/6/45 (Item 45 from file: 96)
00187547 FLUIDEX NO: 0195513 SUBFILE: T
Behaviour of shaft-hub-transverse press-fit joints with a coating to improve friction, in a flexural load cycle.
Konstruktion, vol.38, no.9, Sep. 1986, p.333-339., 1986

21/6/46 (Item 46 from file: 6)
1082942 NTIS Accession Number: PB84-127364
Repeated Uniaxial Tensile Strength Tests on Rock Materials
1983

21/6/47 (Item 47 from file: 8)
01344644
Title: NEW DIAMOND TIPS FOR PROSTHETIC DENTISTRY.
Publication Year: 1982

21/6/48 (Item 48 from file: 63)
00195329 DA
TITLE: ROUGH ROADS IN GEORGIA, MINNESOTA RECEIVE TREATMENT WITH DIAMONDS
PUBLICATION DATE: 19790100
DATA SOURCE: Engineering Index

21/6/49 (Item 49 from file: 6)
0204965 NTIS Accession Number: AD-696 172/XAB

Characteristics of Diamond-Galvanic Coatings
8 Sep 69

21/6/50 (Item 50 from file: 293)
183836
Wear of ultra-high molecular weight polyethylene against damaged and undamaged stainless steel and diamond-like carbon-coated counterfaces.
1998

21/7/2 (Item 2 from file: 2)
DIALOG(R)File 2:INSPEC

6802433 INSPEC Abstract Number: A2001-03-8770J-007
Title: A frictional study of total hip joint replacements
Author(s): Scholes, S.C.; Unsworth, A.; Goldsmith, A.A.J.
Author Affiliation: Centre for Biomed. Eng., Durham Univ., UK
Journal: Physics in Medicine and Biology vol.45, no.12 p.3721-35
Publisher: IOP Publishing,
Publication Date: Dec. 2000 Country of Publication: UK
CODEN: PHMBA7 ISSN: 0031-9155
SICI: 0031-9155(200012)45:12L.3721:FSTJ;1-Y
Material Identity Number: P117-2000-012
U.S. Copyright Clearance Center Code: 0031-9155/2000/123721+15$30.00
Document Number: S0031-9155(00)12431-5
Language: English Document Type: Journal Paper (JP)
Treatment: Practical (P); Experimental (X)
Abstract: Polymeric wear debris produced by articulation of the femoral head against the ultrahigh-molecular-weight polyethylene socket of a total hip replacement has been implicated as the main cause of osteolysis and subsequent failure of these implants. Potential solutions to this problem are to employ hard bearing surface combinations such as metal-on-metal or ceramic-on-ceramic prostheses . The aim of this study was to investigate the difference in lubrication modes and friction of a range of material combinations using synthetic and biological fluids as the lubricants. The experimental results were compared with theoretical predictions of film thicknesses and lubrication modes. A strong correlation was observed between experiment and theory when employing carboxy methyl cellulose (CMC) fluids as the lubricant. Under these conditions the ceramic-on-ceramic joints showed full fluid film lubrication while the metal-on-metal, metal-on-plastic, diamond -like carbon-coated stainless steel (DLC)-on-plastic and ceramic-on-plastic prostheses operated under a mixed lubrication regime. With bovine serum as the lubricant in the all ceramic joints , however, the full fluid film lubrication was inhibited due to adsorbed proteins. In the metal-on-metal joints this adsorbed protein layer acted to reduce the friction while in the ceramic coupling the friction was increased. The use of bovine serum as the lubricant also significantly increased the friction in both the metal-on-plastic and ceramic-on-plastic joints . The friction produced by the DLC-on-plastic joints depended on the quality of the coating. Those joints with a less consistent coating and therefore a higher surface roughness gave significantly higher friction than the smoother, more consistently coated heads. (31 Refs)
Subfile: A

21/7/5 (Item 5 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)

05584189 E.I. No: EIP00065213797
Title: In vitro investigation of diamond-like carbon as a femoral head coating
Author: Affatato, S.; Frigo, M.; Toni, A.
Corporate Source: Istituti Ortopedici Rizzoli, Bologna, Italy
Source: Journal of Biomedical Materials Research v 53 n 3 2000. p 221-226
Publication Year: 2000
CODEN: JBMRBG ISSN: 0021-9304
Language: English
Document Type: JA; (Journal Article) Treatment: X; (Experimental)
Journal Announcement: 0007W5
Abstract: Wear of polyethylene acetabular components of hip implants is a significant clinical problem. In prosthetic hip surgery, polyethylene wear is identified as a factor that limits the life of the implant; it is known that the production of debris can cause adverse tissue reactions that may lead to extensive bone loss around the implant, and consequently loosening of the fixation. A new class of so-called Diamond -Like Carbon coatings , applied to titanium femoral heads was compared to ceramic and metallic heads in terms of wear behavior against UHMWPE using a hip joint simulator with a bovine calf serum lubricant. A thin film of Diamond -Like Carbon was deposited directly onto titanium (Ti6Al4V) head using chemical vapor deposition. The wear of polyethylene coupled with Diamond -Like Carbon coated femoral heads was comparable to that obtained with the polyethylene coupled with commercial-alumina femoral heads. (Author abstract) 40 Refs.

21/7/6 (Item 6 from file: 399)
DIALOG(R)File 399:CA SEARCH(R)

132268494 CA: 132(20)268494a PATENT
Plasma deposition of smooth diamond coating on metals for wear-resistant applications
INVENTOR(AUTHOR): Vohra, Yogesh K.; Catledge, Shane A.
LOCATION: USA
ASSIGNEE: The UAB Research Foundation
PATENT: PCT International ; WO 200018518 A1 DATE: 20000406
APPLICATION: WO 99US22548 (19990930) *US PV102693 (19981001)
PAGES: 35 pp. CODEN: PIXXD2 LANGUAGE: English CLASS: B05D-003/06; C23C-016/27 DESIGNATED COUNTRIES: AL; AM; AT; AU; AZ; BA; BB; BG; BR; BY; CA; CH; CN; CU; CZ; DE; DK; EE; ES; FI; GB; GD; GE; GH; GM; HR; HU; ID; IL; IN; IS; JP; KE; KG; KP; KR; KZ; LC; LK; LR; LS; LT; LU; LV; MD; MG; MK; MN; MW; MX; NO; NZ; PL; PT; RO; RU; SD; SE; SG; SI; SK; SL; TJ; TM; TR; TT; UA; UG; UZ; VN; YU; ZA; ZW; AM; AZ; BY; KG; KZ; MD; RU; TJ; TM
DESIGNATED REGIONAL: GH; GM; KE; LS; MW; SD; SL; SZ; TZ; UG; ZW; AT; BE; CH; CY; DE; DK; ES; FI; FR; GB; GR; IE; IT; LU; MC; NL; PT; SE; BF; BJ; CF; CG; CI; CM; GA; GN; GW; ML; MR; NE; SN; TD; TG
SECTION:
CA256006 Nonferrous Metals and Alloys
CA257XXX Ceramics
CA263XXX Pharmaceuticals
IDENTIFIERS: diamond plasma coating alloy medical implant, plasma deposition diamond film titanium alloy
DESCRIPTORS:
Coating materials...
abrasion-resistant, diamond film; smooth diamond coating on metal or alloy for wear-resistant applications

Prosthetic materials and Prosthetics...
alloys, implants, coating of; smooth diamond coating on metal or alloy for medical implants
Magnetic recording heads...
coating of; smooth diamond coating on metal or alloy for magnetic recording heads
Vapor deposition process...
plasma, microwave-discharge; smooth diamond coating on metal or alloy for wear-resistant applications
CAS REGISTRY NUMBERS:
74-82-8 1333-74-0 processes, plasma from gas mixt. contg.; smooth diamond coating on metal or alloy for wear-resistant applications
12743-70-3 substrate; smooth diamond coating on metal or alloy for wear-resistant applications
7782-40-3 uses, film, nano-structured; smooth diamond coating on metal or alloy for wear-resistant applications
7727-37-9 uses, plasma from gas mixt. contg.; smooth diamond coating on metal or alloy for wear-resistant applications
7439-98-7 uses, substrate; smooth diamond coating on metal or alloy for wear-resistant applications

21/7/8 (Item 8 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

08249033 Genuine Article#: 263BK Number of References: 37
Title: The counterface, surface smoothness, tolerances, and coatings in total joint prostheses
Author(s): Santavirta SS; Lappalainen R (REPRINT) ; Pekko P; Anttila A; Konttinen YT
Corporate Source: UNIV KUOPIO,DEPT APPL PHYS, POB 1627/FIN-70211 KUOPIO//FINLAND/ (REPRINT); UNIV KUOPIO,DEPT APPL PHYS/FIN-70211 KUOPIO//FINLAND/; UNIV HELSINKI,DEPT ORTHOPAED & TRAUMATOL/FIN-00014 HELSINKI//FINLAND/; UNIV HELSINKI,DEPT PHYS/FIN-00014 HELSINKI//FINLAND/; UNIV HELSINKI,DEPT ANAT/FIN-00014 HELSINKI//FINLAND/
Journal: CLINICAL ORTHOPAEDICS AND RELATED RESEARCH, 1999, N369 (DEC), P 92-102
ISSN: 0009-921X Publication date: 19991200
Publisher: LIPPINCOTT WILLIAMS & WILKINS, 227 EAST WASHINGTON SQ, PHILADELPHIA, PA 19106
Language: English Document Type: ARTICLE
Abstract: Proper counterface material combinations, surface finish, and tolerances of contact surfaces are important issues in minimizing friction , wear , and corrosion of total joint prostheses . In the current study, the potential of novel amorphous diamond coatings to solve some present problems in total joint prostheses was studied by using tribological tests with a hip joint simulator and pin-on-disk testers. Based on the tests, the wear of amorphous diamond is negligible compared with conventional hip joint materials (10,000 to 1,000,000 times lower). The coefficient of friction of diamond -coated artificial hip joint was 0.03 to 0.06 when tested in saline solution with loads from 200 to 1000 kg for as many as two million cycles. The friction remained stable throughout the tests. Methylmethacrylate (bone cement) is a typical source of third body wear particles in cemented total hip replacements. The wear tests showed that bone cement (containing hard ceramic particles of barium sulfate or zirconia) severely scratched cobalt chromium molybdenum

alloy samples. These scratches enhance the wear of softer counterpart materials, such as polyethylene or bone cement, whereas diamond - coated surfaces remained undamaged, High quality amorphous diamond coatings offer superior stability (minimal wear debris release in surrounding tissues) and good biomechanical performance.

21/7/11 (Item 11 from file: 108)
DIALOG(R)File 108:AEROSPACE DATABASE

02418297 A99-24099
Diamond -like carbon coatings for orthopaedic applications - An evaluation of tribological performance
Xu, T.; Pruitt, L. (California, Univ., Berkeley)
Journal of Materials Science: Materials in Medicine (ISSN 0957-4530), vol. 10, no. 2, Feb. 1999, p. 83-90.
Feb. 1999 16 REFS.
LANGUAGE: English
COUNTRY OF ORIGIN: United States COUNTRY OF PUBLICATION: United States
DOCUMENT TYPE: JOURNAL ARTICLE
DOCUMENTS AVAILABLE FROM AIAA Technical Library
JOURNAL ANNOUNCEMENT: IAA9905
The purpose of this study is to investigate the tribological behavior of diamond -like carbon (DLC)-coated Ti-6Al-4V against ultrahigh molecular weight polyethylene in order to evaluate the potential of such coatings for total joint replacements; the DLC was deposited by vacuum arc plasma deposition. Short-term and long-term pin-on-disk sliding tests are conducted in order to assess the tribological properties and to evaluate the structural integrity of the coating. Two environments are considered: a non-lubricated condition representing the extreme case of adhesive wear and a distilled-water lubricated condition serving as a reference for future tests on biological fluids. (AIAA)

21/7/12 (Item 12 from file: 399)
DIALOG(R)File 399:CA SEARCH(R)

132199028 CA: 132(15)199028n JOURNAL
Superiority of diamond-like carbon coating on articulating surfaces of artificial hip joints
AUTHOR(S): Anttila, Asko; Lappalainen, Reijo; Heinonen, Harri; Santavirta, Seppo; Konttinen, Yrjo T.
LOCATION: Department of Physics, University of Helsinki, FIN-00014, Helsinki, Finland
JOURNAL: New Diamond Front. Carbon Technol. DATE: 1999 VOLUME: 9
NUMBER: 4 PAGES: 283-288 CODEN: NDFTFF ISSN: 1344-9931 LANGUAGE: English PUBLISHER: Scientific Publishing Division of MYU K.K.
SECTION:
CA263007 Pharmaceuticals
IDENTIFIERS: diamond like carbon coating hip implant
DESCRIPTORS:
Hip...
artificial; diamond-like carbon coating on articulating surfaces of artificial hip joints
Coating materials... Friction... Surface roughness... Wear...
diamond-like carbon coating on articulating surfaces of artificial hip joints
Prosthetic materials and Prosthetics...
implants; diamond-like carbon coating on articulating surfaces of

artificial hip joints
CAS REGISTRY NUMBERS:
7782-40-3 biological studies, -like carbon; diamond-like carbon coating on articulating surfaces of artificial hip joints
7440-44-0 biological studies, diamond-like carbon coating on articulating surfaces of artificial hip joints
9002-88-4 11134-23-9 56847-64-4 diamond-like carbon coating on articulating surfaces of artificial hip joints

21/7/13 (Item 13 from file: 32)
DIALOG(R)File 32:METADEX(R)

1174835 MA Number: 199906-57-0900
High quality diamond-like coating - a superior implant material.
Lappalainen, R ; Anttila, A ; Heinonen, H
University of Helsinki
Conference: Diamond 1998: 9th European Conference on Diamond, Diamond-Like Materials, Nitrides and Silicon Carbide, Crete, Greece, 13-18 Sept. 1998
Publ: Elsevier Science Ltd., Oxford Fulfillment Centre, P.O. Box 800, Kidlington, Oxford OX5 1DX, UK, 1998
Diamond 1998 Abstract Book 9.453 Sept. 1998
Country of Publication: UK
Journal Announcement: 9906
Document Type: Conference Paper (Abstract Only)
Language: ENGLISH
Abstract: Diamond has many superior, desired characteristics of implant materials. It is a nonirritating material, completely immune to body liquids and extremely hard. low friction, high wear and corrosion resistance and well- bonding surface to bone. In this report, the potential of diamond for implants was studied in the form of diamond-like coatings on conventional metal implant materials by comparing friction, wear and corrosion resistance. Diamond-like coatings (sp exp 3 bonding fraction 80%, thickness 0.2-10 mu m) were deposited on stainless steel AISI316L, Ti6Al4V and CoCrMo alloys using filtered pulsed plasma arc discharge method. Tribological characteristics were studied using a pin on disk apparatus and a simplified hip joint simulator with coated or uncoated implant materials in 1 wt.% NaCl distilled water. The average coefficients of static friction (COF) were typically in the range 0.03-0.11 for coated materials and 0.22 for the same metal on metal pair. In pin on disk wear tests, the average wear factors obtained were 140mult10 exp -6 and 50mult10 exp -6 for the pairs of AISI316L and CoCrMo which should be compared to the wear factor of <<0.1mult10 exp -6 mm exp 3 /Nm for the same materials with diamond-like coating. Furthermore, the corrosion rates of these implant materials in 10 wt.% HCl solution were decreased at least by a factor of 10000 and the coatings remained undamaged. As a conclusion, in all the combinations studied diamond- like coatings improved significantly the wear and corrosion resistance compared to the uncoated materials. Similar improvements should also be achievable in vivo in the near future.

21/7/14 (Item 14 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

06891314 Genuine Article#: ZZ288 Number of References: 30
Title: Diamond coated total hip replacements
Author(s): Lappalainen R (REPRINT) ; Anttila A; Heinonen H
Corporate Source: UNIV HELSINKI,DEPT PHYS, SILTAVUORENPENGER 20M/FIN-00014

HELSINKI//FINLAND/ (REPRINT)
Journal: CLINICAL ORTHOPAEDICS AND RELATED RESEARCH, 1998, N352 (JUL), P 118-127
ISSN: 0009-921X Publication date: 19980700
Publisher: LIPPINCOTT-RAVEN PUBL, 227 EAST WASHINGTON SQ, PHILADELPHIA, PA 19106
Language: English Document Type: ARTICLE
Abstract: Diamond has many superior, desired characteristics of implant materials such as low friction , high wear and corrosion resistance, and well bonding surface to bone. The potential of diamond for total hip replacement implants was studied in the form of amorphous diamond coatings on conventional metal implant materials. Amorphous diamond coatings (sp(3) bonding fraction 80%, thickness 0.2 to 10 mu m) were deposited on stainless steel AISI316L, Ti6A14V, and CoCrMo alloys using filtered pulsed plasma are discharge method. Superior attachment of coatings to the implant materials was achieved by using high energy plasma beams to deposit amorphous diamond and proper intermediate layers. Previously it was shown that these coatings are biocompatible causing no local tissue reactions. Tribologic studies using a pin on disk apparatus with coated or uncoated implant materials in 1 wt.% NaCl distilled water were performed, A simplified hip joint simulator was used for preliminary testing of metal on polyethylene and metal on metal artificial hip joints modified with amorphous diamond coating ,. The average coefficients of friction were typically in the range of 0.03 to 0.11 for amorphous diamond coated materials. In the case of metal on metal hip implants, the average friction during initial running in period was improved (coefficient of friction = 0.07) compared with the same metal on metal pair (coefficient of friction = 0.22) and sliding was significantly smoother. In pin on disk wear tests, the average wear factors obtained were 140.10(6), 5.0.10(-6), and much less than 0.1.10(-6) mm(3)/Nm for the pairs of AISI316L, CoCrMo, and the same materials with amorphous diamond coating . The corrosion rates of these implant materials in 10 wt,% HCl solution were decreased by a factor of 10,000 to 15,000 and any damage of the coatings was not observed in 6 months. The results of the tests show that in all the combinations studied, amorphous diamond coating improved definitely the wear and corrosion resistance compared with the uncoated materials.

21/7/15 (Item 15 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

06624446 Genuine Article#: ZF556 Number of References: 39
Title: Materials in total joint replacement
Author(s): Santavirta S (REPRINT) ; Konttinen YT; Lappalainen R; Anttila A; Goodman SB; Lind M; Smith L; Takagi M; GomezBarrena E; Nordsletten L; Xu JW
Corporate Source: UNIV HELSINKI,CENT HOSP, DEPT ORTHOPAED & TRAUMATOL/HELSINKI//FINLAND/ (REPRINT)
Journal: CURRENT ORTHOPAEDICS, 1998, V12, N1 (JAN), P51-57
ISSN: 0268-0890 Publication date: 19980100
Publisher: CHURCHILL LIVINGSTONE, JOURNAL PRODUCTION DEPT, ROBERT STEVENSON HOUSE, 1-3 BAXTERS PLACE, LEITH WALK, EDINBURGH EH1 3AF, MIDLOTHIAN, SCOTLAND
Language: English Document Type: ARTICLE

21/7/16 (Item 16 from file: 2)

DIALOG(R)File 2:INSPEC

5877876 INSPEC Abstract Number: A9810-8770J-001
Title: Some relevant issues related to the use of amorphous diamond coatings for medical applications
Author(s): Lappalainen, R.; Heinonen, H.; Anttila, A.; Santavirta, S.
Author Affiliation: Dept. of Phys., Helsinki Univ., Finland
Journal: Diamond and Related Materials Conference Title: Diam. Relat. Mater. (Switzerland) vol.7, no.2-5 p.482-5
Publisher: Elsevier,
Publication Date: Feb. 1998 Country of Publication: Switzerland
CODEN: DRMTE3 ISSN: 0925-9635
SICI: 0925-9635(199802)7:2/5L.482:SRIR;1-I
Material Identity Number: A464-98002
U.S. Copyright Clearance Center Code: 0925-9635/98/$19.00
Conference Title: 8th European Conference on Diamond, Diamond-like and Related Materials jointly with Applied Diamond Conference 1997, 4th International Conference on the Applications of Diamond Films and Related Materials
Conference Sponsor: ASTeX; De Beers Ind. Diamond Div.; Elsevier Sci.; Renishaw
Conference Date: 3-8 Aug. 1997 Conference Location: Edinburgh, UK
Document Number: S0925-9635(97)00240-9
Language: English Document Type: Conference Paper (PA); Journal Paper(JP)
Treatment: General, Review (G)
Abstract: Amorphous diamond (AD) films (sp/sup 3/ bonding fraction 80%, thickness 200-1000 nm) have been deposited on CoCrMo alloy, stainless steel AISI316L, AISI420, Ti6Al4V alloy and alumina test samples and hip and knee joints using pulsed plasma accelerator method. By using high-energy plasma beams and proper intermediate layers, AD coatings with a high adhesion were produced, We have shown that these coatings are biocompatible, causing no local tissue reactions and offer good tribological characteristics, e.g. Against ultra-high molecular weight polyethylene (UHMWPE). In this study, we concentrate on three relevant issues related to the applicability of AD coatings: (a) high adhesion of the coating to the implant surface and high quality, (b) high-quality surface finish and (c) good corrosion resistance in biological fluids. It should be emphasised that the tribochemical conditions, e.g. In a hip joint , are very severe, and even the best materials (CoCrMo alloys) used at the moment are dissolved or worn out at least 0.02-0.06 mm in 10 years (mean linear wear rate). The results show that in all the combinations studied, AD coating was able to improve the wear and corrosion resistance compared to the uncoated materials. In the best cases, the wear rate was decreased by a factor of 30-600. However, typically special procedures such as sputtering, high deposition energies, filtering of plasma beam, intermediate layers or laminated structures were necessary to optimise the performance. (12 Refs)
Subfile: A

21/7/18 (Item 18 from file: 6)
DIALOG(R)File 6:NTIS

2138206 NTIS Accession Number: DE99002479/XAB
Carbon based prosthetic devices
Devlin, D. J. ; Carroll, D. W. ; Barbero, R. S. ; Archuleta, T. ; Klawitter, J. J.

Los Alamos National Lab., NM.
Corp. Source Codes: 888888888
Sponsor: Department of Energy, Washington, DC.
Report No.: LA-UR-98-3302
31 Dec 1998 13p
Languages: English
Journal Announcement: GRAI9924; ERA9924
Sponsored by Department of Energy, Washington, DC.
Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
NTIS Prices: PC A03/MF A01
Country of Publication: United States
Contract No.: W-7405-ENG-36
This is the final report of a one-year, Laboratory Directed Research and Development (LDRD) project at the Los Alamos National Laboratory (LANL). The project objective was to evaluate the use of carbon/carbon-fiber-reinforced composites for use in endoprosthetic devices. The application of these materials for the metacarpophalangeal (MP) joints of the hand was investigated. Issues concerning mechanical properties, bone fixation, biocompatibility, and wear are discussed. A system consisting of fiber reinforced materials with a pyrolytic carbon matrix and diamond -like, carbon-coated wear surfaces was developed. Processes were developed for the chemical vapor infiltration (CVI) of pyrolytic carbon into porous fiber preforms with the ability to tailor the outer porosity of the device to provide a surface for bone in-growth. A method for coating diamond -like carbon (DLC) on the articulating surface by plasma- assisted chemical vapor deposition (CVD) was developed. Preliminary results on mechanical properties of the composite system are discussed and initial biocompatibility studies were performed.

21/7/20 (Item 20 from file: 335)
DIALOG(R)File 335:Ceramic Abstracts

07518490 DOCUMENT TYPE: PATENT
CSA ACCESSION NUMBER: 76-08756P
PROSTHETIC JOINT WITH DIAMOND COATED INTERFACES
AUTHOR: Pope B J; Garrick R M
VOLUME/PAGE: US Pat.5645601
PATENT ASSIGNEE: Diamicron,Inc
PATENT NUMBER: US 5645601 PATENT DATE: 19970708
PUBLICATION YEAR: 1997
AVAILABLE FROM: American Ceramic Society
LANGUAGE: ENGLISH
ABSTRACT: A prosthetic joint with polycrystalline diamond compact coated interfaces and a method for making the same are disclosed. The prosthetic joint has a diamond layer formed on at least one of the interacting, load-bearing surfaces of the joint . The diamond layer adds resistance to damage from impacts and, when polished, gives the joint a low coefficient of friction , thereby increasing the life of the joint . In accordance with one aspect of the invention, the diamond layer is formed of polycrystalline diamond compact having a common diamond particle diameter of less than 1 micron to further reduce friction .

21/7/21 (Item 21 from file: 2)

DIALOG(R)File 2:INSPEC

5704241 INSPEC Abstract Number: A9721-8770J-017
Title: Industrial coatings used in the orthopaedic industry to reduce wear
Author(s): Lilley, P.A.; Blunn, G.W.
Author Affiliation: Kingston Univ., UK
Conference Title: Fifth International Conference on FACTORY 2000 - The Technology Exploitation Process (Conf. Publ. No.435) p.509-12
Publisher: IEE, London, UK
Publication Date: 1997 Country of Publication: UK xvi+523 pp.
ISBN: 0 85296 682 2 Material Identity Number: XX97-01950
Conference Title: Fifth International Conference on FACTORY 2000 - The Technology Exploitation Process (Conf. Publ. No.435)
Conference Sponsor: IEE
Conference Date: 2-4 April 1997 Conference Location: Cambridge, UK
Language: English Document Type: Conference Paper (PA)
Treatment: Practical (P); Experimental (X)
Abstract: This paper describes some of the findings from tests which look at the protection offered by surface coating both the metal and plastic surfaces of prostheses . All joints experience some form of wear and consequently produce debris . Accumulation of debris can cause adverse cellular reactions resulting in loosening of the prosthesis through bone resorption. Suitable treatments and coatings include titanium nitriding (TiN), implantation of ions into the surface by beam bombardment (nitrogen ion-implantation), and the application of amorphous diamond -like carbon coatings (DLC). The durability and osseous response to coatings and surface treatments applied to prostheses at the bone-implant interface is of great interest if, by such application, the interface can limit wear and increase osseointegration. The greatest flexibility would be offered if such treatments could be applied to both the metal and polymer surfaces. However, some physical methods of application may well restrict the treatment of plastics because of the temperatures involved. Initial investigations indicate that minimum damage occurs to the metal element of the joint combination if a coating of DLC is applied at the optimum thickness. This is evidenced by the lack of transfer film observed by SEM examination and absence of scuffing marks on the surface. Nitrogen ion-implantation of the metal surface appears to have a beneficial effect for potential use in total knee replacements. (1 Refs)
Subfile: A

21/7/25 (Item 25 from file: 73)
DIALOG(R)File 73:EMBASE

06570512 EMBASE No: 1996234974
Human monocytes stimulation by particles of hydroxyapatite, silicon carbide and diamond: In vitro studies of new prosthesis coatings
Nordsletten T.; Hogasen A.K.M.; Konttinen Y.T.; Santavirta S.; Aspenberg P.; Aasen A.O.
Institute for Surgical Research, Rikshospitalet, The National Hospital,N-0027 Oslo Norway
Biomaterials (BIOMATERIALS) (United Kingdom) 1996, 17/15 (1521-1527)
CODEN: BIMAD ISSN: 0142-9612
DOCUMENT TYPE: Journal; Article
LANGUAGE: ENGLISH SUMMARY LANGUAGE: ENGLISH
Aseptic loosening due to wear and debris formation constitutes the

major problem in longevity of joint replacements. Diamond coated onto the prosthesis surface may reduce wear , owing to its excellent tribological properties. A thin diamond coating may be brittle, and we plan eventually to reinforce it with silicon carbide whiskers (SiC). In the present study we compared particles of diamond , SiC and hydroxyapatite (HA) in serum-free cultures of human monocytes. All particles were found to be phagocytozed, and monocyte morphology changed except after the ingestion of diamond . Interleukin-1beta production was increased on average 30-fold and 38-fold in cultures exposed to HA and SiC, respectively, compared to control and diamond cultures (n = 6). Addition of the phagocytosis inhibitor cytochalasin B inhibited the morphological changes of the monocytes and reduced interleukin-1beta production. In some experiments particles of polymethylmethacrylate were also included, and the interleukin-1beta stimulation was in the same range as after HA and SiC stimulation. The results show that diamond particles in serum-free monocyte culture are inert, while SiC and HA have a stimulatory effect comparable to polymethylmethacrylate. With its excellent tribological and biocompatible properties, future studies with diamond coating are warranted.

21/7/26 (Item 26 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)

04569243 E.I. No: EIP96123432149
Title: Tribological evaluation of amorphous diamond like carbon coating for use in total joint replacement
Author: Hailey, J.L.; Firkins, P.; Butter, R.; Lettington, A.H.; Fisher,J.
Corporate Source: Univ of Leeds, Leeds, UK
Conference Title: Proceedings of the 1996 5th World Biomaterials Congress. Part 2 (of 2)
Conference Location: Toronto, Can Conference Date: 19960529-19960602
E.I. Conference No.: 45651
Source: Transactions of the Annual Meeting of the Society for Biomaterials in conjunction with the International Biomaterials Symposium v 2 1996. Soc for Biomaterials, St. Louis Park, MN, USA. p 785
Publication Year: 1996
CODEN: TAMSEN
Language: English
Document Type: CA; (Conference Article) Treatment: X; (Experimental)
Journal Announcement: 9701W4
Abstract: A study which evaluated the wear performance and damage resistance of an amorphous diamond like carbon (ADLC) coating for use in total joint replacement has demonstrated the improved damage resistance offered by ADLC coatings, as compared to conventional stainless steel prostheses . The wear rate of ultra-high molecular weight polyethylenes (UHMWPE) against damaged ADLC is significantly lower than that of UHMWPE versus damaged stainless steel. Thus, it appears that ADLC coatings have considerable potential for use in artificial joints . 2 Refs.

21/7/28 (Item 28 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)

04396685 E.I. No: EIP96053162798
Title: Benign response to particles of diamond and SiC: Bone chamber studies of new joint replacement coating materials in rabbits
Author: Aspenberg, Per; Anttila, Asko; Konttinen, Yrjo T.; Lappalainen, Reijo; Goodman, Smart B.; Nordsletten, Lars; Santavirta, Seppo
Corporate Source: Univ Hospital, Lund, Sweden

Source: Biomaterials v 17 n 8 Apr 1996. p 807-812
Publication Year: 1996
CODEN: BIMADU ISSN: 0142-9612
Language: English
Document Type: JA; (Journal Article) Treatment: X; (Experimental)
Journal Announcement: 9606W5
Abstract: Wear particles from total joint replacements are thought to accelerate prosthetic loosening. Diamond coating may improve the smoothness and wear characteristics of the femoral head component of total hip replacements, and thus increase their longevity. The brittleness of a thin diamond coat may be overcome by using an SiC-whisker diamond composite. This study describes the reactions of regenerating bone tissue to phagocytosable particles of diamond and SiC, using implanted bone harvest chambers in rabbits. The particles were dispersed in hyaluronan and introduced into a canal transversing the implant. The tissue that entered the canal during the following 3 weeks was then harvested. In previous studies using this model, particles of high density polyethylene, bone cement and chromium-cobalt all caused an inflammatory reaction and a marked decrease in the amount of ingrown bone. In the present study, neither the diamond nor the SiC particles caused any decrease in bone formation. It appears that particles of diamond and SiC are comparatively harmless. (Author abstract) 15 Refs.

21/7/31 (Item 31 from file: 2)
DIALOG(R)File 2:INSPEC

5236452 INSPEC Abstract Number: A9610-8770J-004
Title: Diamond-like carbon for biomedical applications
Author(s): Butter, R.S.; Lettington, A.H.
Author Affiliation: J.J. Thomson Phys. Lab., Reading Univ., UK
Journal: Journal of Chemical Vapor Deposition vol.3, no.3 p.182-92
Publisher: Technomic Publishing,
Publication Date: Jan. 1995 Country of Publication: USA
CODEN: JCVDET ISSN: 1056-7860
SICI: 1056-7860(199501)3:3L.182:DLCB;1-E
Material Identity Number: P811-96002
U.S. Copyright Clearance Center Code: 1056-7860/95/030182-11$10.00/0
Language: English Document Type: Journal Paper (JP)
Treatment: Bibliography (B); General, Review (G); Experimental (X)
Abstract: Reviews the current state of published work relating to the application of diamond -like carbon (DLC) coatings in the biomedical held. An early indication of the value of DLC as a biocompatible coating was provided by in vivo trials, where DLC-coated pins implanted into sheep showed good bonding of tissue to the coating. More recent interest has led to the publication of a number of in vitro and in vivo studies of DLC coatings for a variety of specific biomedical applications. The current level of investigations indicate that DLC shows considerable potential as a biomaterial. In vitro work shows that DLC does not promote a toxic response in cell culture tests. The implantation of DLC coated components in vivo has demonstrated its suitability in non-bearing situations. Extensive wear testing under simulated physiological conditions shows that DLC coatings should provide a significant benefit over uncoated stainless steel components in joint prostheses . However, it is well known that the properties of DLC films depend critically on the deposition method and parameters, and these must be optimised to produce a good quality coating. In addition, of prime importance in the testing of a potential is that the tests chosen are relevant and appropriate to the intended application. (55 Refs)

Subfile: A
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21/7/32 (Item 32 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)
(c) 2001 Engineering Info. Inc. All rts. reserv.
04722719 E.I. No: EIP97063689711
Title: System approach to improved orthopaedic prosthetic devices
Author: Devlin, D.; Cowie, J.; Carroll, D.; Rivero, D.
Corporate Source: Los Alamos Natl Lab, Los Alamos, NM, USA
Conference Title: Proceedings of the 1995 ASME International Mechanical Engineering Congress and Exposition
Conference Location: San Francisco, CA, USA Conference Date: 19951112-19951117
Sponsor: ASME BED
E.I. Conference No.: 44144
Source: 1995 Advances in Bioengineering American Society of Mechanical Engineers, Bioengineering Division (Publication) BED v 31 1995. ASME, New York, NY, USA. p 31-32
Publication Year: 1995
CODEN: ASMBEP
Language: English
Document Type: CA; (Conference Article) Treatment: G; (General Review)
Journal Announcement: 9708W1
Abstract: Carbon carbon composites and diamond -like carbon (DLC) coatings are proposed as materials for orthopedic prosthetics . Carbon fiber reinforced composites offer the possibility of tailoring the required elastic and strength properties of prosthetic device. These materials also lessen the cortical thinning of bones when used as plastic fixation plates with a methyl methacrylate matrix. DLC films exhibit extraordinary wear resistance, coefficient of friction and biocompatibility. The use of the microwave discharge-enhanced chemical vapor deposition technique to produce relatively thick coating of DLC onto the carbon composites offers the best possibility for improving biomedical prostheses .

21/7/37 (Item 37 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)
(c) 2001 Engineering Info. Inc. All rts. reserv.
04042608 E.I. No: EIP94122458733
Title: Diamond and diamond like carbon coatings
Author: McColl, I.R.; Wood, J.V.; Grant, D.M.
Corporate Source: Univ of Nottingham, Nottingham, Engl
Source: Transactions of the Institute of Metal Finishing v 72 n pt 3 Aug 1994. p 120-123
Publication Year: 1994
CODEN: TIMFA2 ISSN: 0020-2967
Language: English
Document Type: JA; (Journal Article) Treatment: X; (Experimental)
Journal Announcement: 9503W4
Abstract: Diamond and diamond like carbon (DLC) exhibit properties which make them attractive for a range of applications from coatings on cutting tools through to heat dissipation in hybrid integrated circuits and wear resistant biocompatible coatings for surgical prostheses . Properties include high hardness, wear resistance, low coefficient of friction , chemical inertness, high thermal conductivity and low electrical conductivity. A range of processes based on physical and chemical vapour deposition (CVD) technologies are used to deposit diamond and DLC.

Processes involving microwave assisted CVD and thermally excited (hot filament) CVD are the principal processes for the growth of thin film diamond . Radio frequency plasma assisted CVD and dual ion beam sources are typical techniques for the growth of DLC. Although diamond and DLC coatings are at the production stage there is still the major problem of service reliability to be overcome, that is, problems of coating adhesion and residual stresses. The research effort at Nottingham is centred on the use of diamond coatings for improved cutting effectiveness, and diamond like carbon coatings for biocompatible wear resistant coatings. (Author abstract) 13 Refs.

21/7/38 (Item 38 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)

03916306 E.I. No: EIP94081360053
Title: Diamond , diamond -like and titanium nitride biocompatible coatings for human body parts
Author: Narayan, J.; Fan, W.D.; Narayan, R.J.; Tiwari, P.; Stadelmaier,H.H.
Corporate Source: North Carolina State Univ, Raleigh, NC, USA
Source: Materials Science & Engineering B: Solid-State Materials for Advanced Technology v B25 n 1 Jun 1994. p 5-10
Publication Year: 1994
CODEN: MSBTEK ISSN: 0921-5107
Language: English
Document Type: JA; (Journal Article) Treatment: A; (Applications); X; (Experimental)
Journal Announcement: 9409W5
Abstract: A new approach is proposed for fabricating human body parts that last longer and are more biocompatible than those presently available. In this approach, bulk material is chosen that has desirable mechanical properties (low modulus, high strength, high ductility and high fatigue strength) and then this material is coated with highly corrosion- and erosion -resistant and totally biocompatible layers. As an example, we have investigated diamond , TiN, diamond /diamond -like, and diamond /TiN coatings on Ti-6wt.%Al-4wt.%V alloy used for hip prosthesis . This alloy has desirable mechanical properties but the toxicity of vanadium and the neurological disorders associated with aluminum have raised some concerns. To overcome this problem, we have developed a laser physical vapor deposition method to form TiN and diamond -like coatings , and a hot-filament-assisted chemical vapor deposition method to form diamond layers. Cementless diamond -coated hip prostheses of titanium alloys are expected to last approximately ten times longer or more compared with the polymethylmethacrylate-cement-coated Co-Cr prostheses used at present. The microstructure of diamond films can be controlled by substrate and deposition variables. The microstructures of these films have been investigated using optical and scanning electron microscopy, chemical composition by Auger electron spectroscopy, structure by X-ray diffraction, and atomic arrangements (lattice vibration) characteristics by Raman spectroscopy. The average grain size of diamond films varied from 0.5 to 2.0 mu m, and the diamond -like films were amorphous. The average grain size of TiN films was found to vary from 10 to 20 nm. The diamond films showed characteristic Raman peak at 1332 cm** minus **1 (sp**3 bonding), and diamond -like films contained 1350 and 1580 cm** minus **1 Raman peaks (a mixture of sp**2 and sp**3 bonding). The mechanical properties and adhesion characteristics of these films together with biocompatibility issues are discussed for titanium alloy hip prosthesis . (Author abstract) 8 Refs.

21/7/39 (Item 39 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)

03711595 E.I. No: EIP93091084423
Title: Diamond -like carbon: a potential means of reducing wear in total joint replacements
Author: Dearnaley, G.
Corporate Source: AEA Industrial Technology, Didcot, Engl
Source: Clinical Materials v 12 n 4 1993. p 237-244
Publication Year: 1993
CODEN: CLNME2 ISSN: 0267-6605
Language: English
Document Type: JA; (Journal Article) Treatment: X; (Experimental); A; (Applications)
Journal Announcement: 9311W3
Abstract: This paper begins with a review of recent studies of the progressive mechanisms of degradation in the total hip and knee replacements. It is concluded that wear is a major problem due to resulting tissue reactions especially to fine polymeric debris . Methods of lessening or overcoming these problems by modern methods of surface modification are considered, among these being ion implantation and ion beam-assisted deposition. It is argued that the physical and chemical properties of diamond -like carbon (DLC) coatings make them especially promising for the reduction of friction and adhesive wear in all forms of total joint replacement. An ion beam-assisted method of depositing DLC efficiently at low temperatures is described, together with the physical properties of the resulting material. (Author abstract) 32 Refs.

21/7/42 (Item 42 from file: 323)
DIALOG(R)File 323:RAPRA Rubber & Plastics

00419188
TITLE: TWO FIRMS EXPLORING DIAMOND COATING
AUTHOR(S): Rowand R
SOURCE: Plastics News Usa; 2, No.47, 28th Jan.1991, p.13
JOURNAL ANNOUNCEMENT: 199106 RAPRA UPDATE: 199110
DOCUMENT TYPE: Journal Article
LANGUAGE: English
SUBFILE: (R) RAPRA
ABSTRACT: Monsanto Chemical and Diamonex have agreed to investigate diamond coating of large-area polymer surfaces and to form a joint manufacturing venture. One large-volume use might be auto side windows, a major advantage would be weight savings of as much as 5 pounds per car. The diamond coating is applied through a sputtering process and can be used on most types of plastics. In addition to scratch resistance, the transparent, ultra-hard, thin diamond coating also is chemical resistant and yields a non-stick surface with a coefficient of friction similar to that of surfaces with Teflon coating.

21/7/51 (Item 51 from file: 198)
DIALOG(R)File 198:Health Devices Alerts(R)

00702313 ABS-36024 SUBFILE: ABS
PRODUCT(s): 16-150 PROSTHESES , JOINT , HIP, TOTAL
16-084 Prostheses , Joint , Hip, Acetabular Component
16-095 Prostheses , Joint , Hip, Femoral Component

The authors investigated the effect of amorphous diamond coatings on bone cement, polyethylene, or amorphous diamond hip prosthesis components. They state that the polyethylene wear rate decreased slightly in polyethylene-amorphous diamond testing, was significantly reduced in diamond -on-diamond contact, and remained unaffected in bone-diamond testing. The authors conclude that high-quality amorphous diamond coatings offer superior stability and good biomechanical performance.

29/6/1 (Item 1 from file: 33)
746582
Acoustic Resonance Methods for Measuring Dynamic Elastic Modulus of Adhesive Bonds.
1990

29/7/2 (Item 1 from file: 335)
DIALOG(R)File 335:Ceramic Abstracts

07518490 DOCUMENT TYPE: PATENT
This is a duplicate
CSA ACCESSION NUMBER: 76-08756P
PROSTHETIC JOINT WITH DIAMOND COATED INTERFACES
AUTHOR: Pope B J; Garrick R M
VOLUME/PAGE: US Pat.5645601
PATENT ASSIGNEE: Diamicron,Inc
PATENT NUMBER: US 5645601 PATENT DATE: 19970708
PUBLICATION YEAR: 1997
AVAILABLE FROM: American Ceramic Society
LANGUAGE: ENGLISH
ABSTRACT: A prosthetic joint with polycrystalline diamond compact coated interfaces and a method for making the same are disclosed. The prosthetic joint has a diamond layer formed on at least one of the interacting, load-bearing surfaces of the joint . The diamond layer adds resistance to damage from impacts and, when polished, gives the joint a low coefficient of friction , thereby increasing the life of the joint . In accordance with one aspect of the invention, the diamond layer is formed of polycrystalline diamond compact having a common diamond particle diameter of less than 1 micron to further reduce friction .

31/7/6 (Item 1 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

08310433 Genuine Article#: 270AE Number of References: 27
Title: Assessing acute platelet adhesion on opaque metallic and polymeric biomaterials with fiber optic microscopy
Author(s): Schaub RD; Kameneva MV; Borovetz HS; Wagner WR (REPRINT)
Corporate Source: UNIV PITTSBURGH,DEPT BIOENGN, CTR BIOTECHNOL & BIOENGN 420, 300 TECHNOL DR/PITTSBURGH//PA/15219 (REPRINT); UNIV PITTSBURGH,DEPT BIOENGN, CTR BIOTECHNOL & BIOENGN 420/PITTSBURGH//PA/15219
Journal: JOURNAL OF BIOMEDICAL MATERIALS RESEARCH, 1999, V49, N4 (MAR 15) , P460-468
ISSN: 0021-9304 Publication date: 19990315
Publisher: JOHN WILEY & SONS INC, 605 THIRD AVE, NEW YORK, NY 10158-0012
Language: English Document Type: ARTICLE
Abstract: The degree of platelet adhesion and subsequent thrombus formation is an important measure of biocompatibility for cardiovascular biomaterials. Traditional methods of quantifying platelet adhesion

often are limited by the need for direct optical access, limited spatial resolution, or the lack of temporal resolution. We have developed a new imaging system that utilizes fiber optics and fluorescence microscopy for the quantification of platelet adhesion. This fiber optic remote microscope is capable of imaging individual fluorescently labeled platelets in whole blood on opaque surfaces. Using this method, platelet adhesion was quantified on a series of metallic [low-temperature isotropic carbon (LTIC); titanium alloy (Ti); diamond -like carbon (DLC); oxidized titanium alloy (TiO); and polycrystalline diamond (PCD)] and polymeric [woven Dacron (WD)] collagen-impregnated Dacron (HEM), expanded polytetrafluoroethylene (ePTFE), and denucleated ePTFE (dePTFE)] biomaterials designed for use in cardiovascular applications. These materials were perfused with heparinized whole human blood in an in vitro parallel plate flow chamber. Platelet adhesion after 5 min of perfusion ranged from 3.7 +/- 1.0 (dePTFE) to 16.8 +/- 1.5 (WD) platelets/1000 mu m. The temporal information revealed by these studies provides a comparative measure of the acute thrombogenicity of these materials as well as some insight into their long-term hemocompatibilities. Also studied here were the effects of wall shear rate and axial position on platelet adhesion. A predicted increase in platelet adhesion with increased wall shear rate and a trend toward a decrease in platelet adhesion with increased axial distance was observed with the fiber optic microscope. Future applications for this imaging technique may include the long-term evaluation of thrombosis in blood-contacting devices in vitro and, in animal models, iri vivo. (C) 2000 John Wiley & Sons, Inc.

31/7/8 (Item 3 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

02119123 Genuine Article#: KC291 Number of References: 176
Title: VAPOR-PHASE-DEPOSITED DIAMOND - PROBLEMS AND POTENTIAL
Author(s): YARBROUGH WA
Corporate Source: PENN STATE UNIV,MAT RES LAB/UNIV PK//PA/16802
Journal: JOURNAL OF THE AMERICAN CERAMIC SOCIETY, 1992, V75, N12 (DEC), P 3179-3200
ISSN: 0002-7820
Language: ENGLISH Document Type: REVIEW
Abstract: Considerable progress has been made toward the goal of diamond synthesis by chemical vapor deposition (CVD). This progress consists of improved methods for synthesis and understanding how diamond is formed. The field has rapidly expanded with industrial consortia, international joint ventures, specialized journals, novel methods for synthesis and processing, and the introduction of new products. Despite this expansion, many issues remain unresolved, generating considerable debate within the research community. Among these debates is the question of how diamond is formed. Both thermodynamics and kinetics are frequently debated at the many worldwide meetings on this technology. The resolution of these issues awaits further progress and, with improved understanding, may have implications for the synthesis of other ceramic materials. The diamond research community includes not only ceramists and other materials scientists, but specialists in subjects that range from chemistry and chemical engineering to solid-state physics and electrical engineering. Crystals are grown using methods that range from the use of high-power plasmas and the combustion of acetylene in oxygen to the thermal decomposition of fluorocarbons and various hydrocarbons in the presence of fluorine.

Although some evidence exists for diamond heteroepitaxy, the goal of large-area heteroepitaxial diamond has proved elusive. Thick (> 100 mum), free-standing, polycrystalline diamond layers are being grown, and their properties rival those of natural crystals. Methods have been developed for the cutting, polishing, and brazing of diamond , and products are being tested in the marketplace. Engineering of the diamond -substrate interface for acceptable adhesion and reliability has progressed, although much work remains to be done. The central issues for commercialization are less the question of whether diamond can be grown in sufficient amounts or with sufficiently attractive properties, but rather whether the fabrication methods can be made sufficiently cost-effective for the markets envisioned.

File 2:INSPEC 1969-2001/Feb W1
File 34:SciSearch(R) Cited Ref Sci 1990-2001/Feb W1
File 335:Ceramic Abstracts 1976-2000/Q4
File 440:Current Contents Search(R) 1990-2001/Feb W2

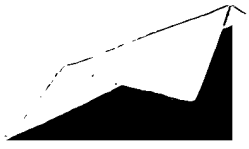
Set	Items	Description
S1	5	POLYCRYSTALLINE()DIAMOND? ? AND (PROSTHESIS OR PROSTHESES - OR PROSTHETIC? ?)
S2	**3**	**RD (unique items)**
S3	4554	POLYCRYSTALLINE()DIAMOND? ?
S4	450481	MEDICAL OR KNEE OR HIP
S5	14	S3 AND S4
S6	**13**	**S5 NOT S2**
S7	4	RD (unique items)

2/7/1 (Item 1 from file: 2)
DIALOG(R)File 2:INSPEC

4967680 INSPEC Abstract Number: A9513-8115H-030
Title: CVD diamond films on bio-medical ceramics
Author(s): Cifre, J.; Polo, M.C.; Sanchez, G.; Lousa, A.; Esteve, J.
Author Affiliation: Dept. de Fisica Aplicada i Electron., Barcelona Univ., Spain
Journal: Diamond and Related Materials vol.4, no.5-6 p.798-801
Publication Date: 1 May 1995 Country of Publication: Switzerland
CODEN: DRMTE3 ISSN: 0925-9635
U.S. Copyright Clearance Center Code: 0925-9635/95/$09.50
Conference Title: 5th European Conference on Diamond, Diamond-Like and Related Materials (Diamond Films '94)
Conference Sponsor: AEA Technol.; ASTeX; Applied Sci.; De Beers Ind. Diamond Div.; et al
Conference Date: 25-30 Sept. 1994 Conference Location: Il Ciocco, Italy
Language: English Document Type: Conference Paper (PA); Journal Paper(JP)
Treatment: Experimental (X)
Abstract: In this study, the growth of diamond films by the hot filament chemical vapour deposition method on ceramic substrates is presented. The ceramics, used in teeth implants, were sintered at 970 degrees C, and were mainly constituted by SiO/sub 2/, Al/sub 2/O/sub 3/ and other oxides. To avoid substrate damaging, the diamond deposition was carried out at a lower temperature than usual. Raman spectroscopy demonstrated the growth of polycrystalline diamond films with a very low content of amorphous carbon phases at a temperature as low as 750 degrees C. The thermal expansion mismatch between film and substrate causes the films thicker than 0.2 mu m to break, but the high nucleation density of diamond obtained when the ceramic was scratched with diamond powder allowed the formation of compact and well-adhered diamond films, even with this small thickness. Optical analysis of the reflection spectra of the coating in the visible range, when compared with the spectra of the bare ceramic, showed that diamond films do not appreciably affect the reflection of light. (6 Refs)
Subfile: A

2/7/2 (Item 1 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

08310433 Genuine Article#: 270AE Number of References: 27
Title: Assessing acute platelet adhesion on opaque metallic and polymeric biomaterials with fiber optic microscopy



Author(s): Schaub RD; Kameneva MV; Borovetz HS; Wagner WR (REPRINT)
Corporate Source: UNIV PITTSBURGH,DEPT BIOENGN, CTR BIOTECHNOL & BIOENGN 420, 300 TECHNOL DR/PITTSBURGH//PA/15219 (REPRINT); UNIV PITTSBURGH,DEPT BIOENGN, CTR BIOTECHNOL & BIOENGN 420/PITTSBURGH//PA/15219
Journal: JOURNAL OF BIOMEDICAL MATERIALS RESEARCH, 1999, V49, N4 (MAR 15), P460-468
ISSN: 0021-9304 Publication date: 19990315
Publisher: JOHN WILEY & SONS INC, 605 THIRD AVE, NEW YORK, NY 10158-0012
Language: English Document Type: ARTICLE
Abstract: The degree of platelet adhesion and subsequent thrombus formation is an important measure of biocompatibility for cardiovascular biomaterials. Traditional methods of quantifying platelet adhesion often are limited by the need for direct optical access, limited spatial resolution, or the lack of temporal resolution. We have developed a new imaging system that utilizes fiber optics and fluorescence microscopy for the quantification of platelet adhesion. This fiber optic remote microscope is capable of imaging individual fluorescently labeled platelets in whole blood on opaque surfaces. Using this method, platelet adhesion was quantified on a series of metallic [low-temperature isotropic carbon (LTIC); titanium alloy (Ti); diamond-like carbon (DLC); oxidized titanium alloy (TiO); and polycrystalline diamond (PCD)] and polymeric [woven Dacron (WD)] collagen-impregnated Dacron (HEM), expanded polytetrafluoroethylene (ePTFE), and denucleated ePTFE (dePTFE)] biomaterials designed for use in cardiovascular applications. These materials were perfused with heparinized whole human blood in an in vitro parallel plate flow chamber. Platelet adhesion after 5 min of perfusion ranged from 3.7 +/- 1.0 (dePTFE) to 16.8 +/- 1.5 (WD) platelets/1000 mu m. The temporal information revealed by these studies provides a comparative measure of the acute thrombogenicity of these materials as well as some insight into their long-term hemocompatibilities. Also studied here were the effects of wall shear rate and axial position on platelet adhesion. A predicted increase in platelet adhesion with increased wall shear rate and a trend toward a decrease in platelet adhesion with increased axial distance was observed with the fiber optic microscope. Future applications for this imaging technique may include the long-term evaluation of thrombosis in blood-contacting devices in vitro and, in animal models, iri vivo. (C) 2000 John Wiley & Sons, Inc.

2/7/3 (Item 1 from file: 335)
DIALOG(R)File 335:Ceramic Abstracts

07518490 DOCUMENT TYPE: PATENT
CSA ACCESSION NUMBER: 76-08756P
PROSTHETIC JOINT WITH DIAMOND COATED INTERFACES
AUTHOR: Pope B J; Garrick R M
VOLUME/PAGE: US Pat.5645601
PATENT ASSIGNEE: Diamicron,Inc
PATENT NUMBER: US 5645601 PATENT DATE: 19970708
PUBLICATION YEAR: 1997
AVAILABLE FROM: American Ceramic Society
LANGUAGE: ENGLISH
ABSTRACT: A prosthetic joint with polycrystalline diamond compact coated interfaces and a method for making the same are disclosed. The prosthetic joint has a diamond layer formed on at least one of the interacting, load-bearing surfaces of the joint. The diamond layer adds

resistance to damage from impacts and, when polished, gives the joint a low coefficient of friction, thereby increasing the life of the joint. In accordance with one aspect of the invention, the diamond layer is formed of polycrystalline diamond compact having a common diamond particle diameter of less than 1 micron to further reduce friction.

6/6/2 (Item 2 from file: 34)
04802747 Genuine Article#: UH584 Number of References: 40
Title: EXPERIMENTAL-STUDY OF TERNARY PD-SI-C PHASE-EQUILIBRIA AND PD/SIC INTERFACE REACTIONS (Abstract Available)

6/6/3 (Item 1 from file: 335)
07523768
FABRICATION OF NEW POROUS METAL-BONDED GRINDING WHEELS BY HIP METHOD AND MACHINING ELECTRONIC CERAMICS

6/6/12 (Item 9 from file: 440)
06359506 GENUINE ARTICLE#: QV435 NUMBER OF REFERENCES: 6
TITLE: CVD DIAMOND FILMS ON BIO- MEDICAL CERAMICS (Abstract Available)
1995

6/7/1 (Item 1 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

08215786 Genuine Article#: 258YM Number of References: 22
Title: Synthesis and properties of single phase diamond ceramics
Author(s): Semchinova OK (REPRINT) ; Graul J; Neff H; Holzhuter G; Smirnov EP; Davydov VY
Corporate Source: UNIV HANNOVER,INFORMAT TECHNOL LAB, SCHNEIDERBERG 32/D-30167 HANNOVER//GERMANY/ (REPRINT); UNIV FED PARAIBA,CTR CIENCIAS & TECNOL, DEPT ELECT ENGN/BR-58109970 CAMPINAS GRANDE/SP/BRAZIL/; UNIV ROSTOCK,FACHBEREICH PHYS/D-18051 ROSTOCK//GERMANY/; TECHNOL UNIV,/ST PETERSBURG 198013//RUSSIA/; AF IOFFE PHYS TECH INST,/ST PETERSBURG 194021//RUSSIA/
Journal: DIAMOND AND RELATED MATERIALS, 1999, V8, N12 (DEC), P2140-2147
ISSN: 0925-9635 Publication date: 19991200
Publisher: ELSEVIER SCIENCE SA, PO BOX 564, 1001 LAUSANNE, SWITZERLAND
Language: English Document Type: ARTICLE
Abstract: We report on the synthesis of single phase diamond ceramics and its microstructural and physical characterization. The most relevant physical properties are listed and are compared to natural diamond. The ceramic solid has been fabricated from chemically treated micro crystalline diamond powder, where oxy-functional groups have been attached to the surface. The special surface treatment is considered essential to achieve direct atomic bonding between adjacent grains. The hot isostatic pressing method (HIP) has been applied for materials processing that pertains to the stability region of the related carbon phase diagram. No further additives have been used for preparation. Transmission and scanning electron microscopy, energy dispersive X-ray analysis, X-ray diffraction and Raman spectroscopy have been used for the micro structural analysis. The achievable density is close to that of natural diamond, revealing porosity values of <3%. The micro structural analyses indicated the presence of small amounts of isolated diamond micro crystals, embedded into a matrix of **polycrystalline diamond** with a very small grain size. The grains are much smaller than the originally used micro crystalline source material, indicating crystal break-up and atomic rebonding during the sintering process.

Also traces of sp(2)-hybridized carbon have been identified, located primarily at grain boundaries. Fracture of the material appears mostly transgranular. Relevant physical properties as thermal and electrical conductivity, hardness and Young's modulus approach those of natural diamond. (C) 1999 Elsevier Science S.A. All rights reserved.

6/3,K/4 (Item 1 from file: 440)
DIALOG(R)File 440:Current Contents Search(R)
(c) 2001 Inst for Sci Info. All rts. reserv.
11907916
ISSN: 0036-8075
JOURNAL: SCIENCE , 2000
(TABLE OF CONTENTS RECORD)
(The Complete Table of Contents now Available in Format 19)
...English. BOOK REVIEW. 1 REFERENCES
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ISSN: 0925-9635
JOURNAL: DIAMOND AND RELATED MATERIALS , 1998
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Flannery CM; Kehoe LP; Cream GM...P. 565-568. High-performance metal-semiconductor field effect transistors from thin-film polycrystalline diamond . Looi HJ; Pang LYS; Wang Y; Whitfield MD; Jackman RB. UNIV COLL LONDON,TORRINGTON PL...
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07749111
ISSN: 0925-9635
JOURNAL: DIAMOND AND RELATED MATERIALS , 1996
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...P. 1195-1203. Reactions between tungsten and molybdenum thin films and polycrystalline diamond substrates. Yeh JJ (REPRINT) ; Pfeffer RL; Cole MW; Ohring M; Yehoda JE. STEVENS INST TECHNOL...

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07482859
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JOURNAL: JOURNAL OF MATERIALS PROCESSING TECHNOLOGY , 1996
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...P. 168-176. DEVELOPMENT IN MEDICAL -GRADE ALUMINA DURING THE PAST TWO DECADES. WILLMANN G. CERASIV GMBH,INNOVAT KERAM ENGN,MED...P. 422-430. MAGNETRON SPUTTERING OF TIN PROTECTIVE COATINGS FOR MEDICAL APPLICATIONS. KOLA PV; DANIELS S; CAMERON DC; HASHMI MSJ. DUBLIN CITY UNIV,ADV MAT PROC...
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6/3,K/10 (Item 7 from file: 440)
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06973995
ISSN: 0040-6090
JOURNAL: THIN SOLID FILMS , 1995
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...OF TI-6AL-4V AFTER ION IMPLANTATION OF NITROGEN IN CONNECTION WITH ITS APPLICATION FOR HIP -JOINT PROSTHESIS. TORREGROSA F; BARRALLIER L; ROUX ...P. 278-281. PHOTOVOLTAIC EFFECTS IN METAL/SEMICONDUCTOR BARRIER STRUCTURES WITH BORON-DOPED POLYCRYSTALLINE DIAMOND FILMS. POLYAKOV VI; PEROV PI; ROSSUKANYI NM; RUKOVISHNIKOV AI; KHOMICH AV; PRELAS MA;

KHASAWINAH S...

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...P. 798-801. CVD DIAMOND FILMS ON BIO-MEDICAL CERAMICS. CIFRE J; POLO MC; SANCHEZ G; LOUSA A; ESTEVE J. UNIV BARCELONA,DEPT FIS...

6/3,K/13 (Item 10 from file: 440)
DIALOG(R)File 440:Current Contents Search(R)
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02460981
JOURNAL: POWDER METALLURGY INTERNATIONAL , 1990
(TABLE OF CONTENTS RECORD)
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...P. 18&. RESIDUAL STRESS DETERMINATION IN HARDMETAL AND POLYCRYSTALLINE DIAMOND USING THE AIR-ABRASIVE BLIND-HOLE DRILLING TECHNIQUE. SCHWARTZ IF. UNIV WITWATERSRAND,DEPT MET & MAT...
...P. 41-42. NEW ADVANCES IN HIP TECHNOLOGY. ENGLISH. EDITORIAL. 0 References...

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File 47:Gale Group Magazine DB(TM) 1959-2001/Feb 06
File 636:Gale Group Newsletter DB(TM) 1987-2001/Feb 06
File 637:Journal of Commerce 1986-2001/Feb 07
File 727:Canadian Newspapers 1990-2001/Feb 07
File 149:TGG Health&Wellness DB(SM) 1976-2001/Jan W4
File 88:Gale Group Business A.R.T.S. 1976-2001/Feb 07
File 9:Business & Industry(R) Jul/1994-2001/Feb 06
File 160:Gale Group PROMT(R) 1972-1989
File 148:Gale Group Trade & Industry DB 1976-2001/Feb 06
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S1	293239	DIAMOND? ?
S2	5856	POLYCRYSTALLINE
S3	30163	PROSTHE?
S4	2690788	JOINT? ?
S5	1377	FEMORAL()HEAD OR BALL(2N)SOCKET
S6	470440	WEAR
S7	81217	DEBRIS
S8	265795	ERODE? ? OR EROSION OR ERODING
S9	77172	FRICTION
S10	22034	ABRASION
S11	106091	FATIGUE
S12	4652	SPALL?
S13	1007980	SURFACE? ?
S14	197715	COAT? ?
S15	152863	COATED
S16	257929	COATING? ?
S17	1233583	BOND OR BONDS
S18	120922	BONDED OR BONDING
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S20	1758324	JOINED OR JOINING
S21	1093	S2()S1
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S26	27	S25 AND S18:S20
S27	**27**	**Sort S26/ALL/PD,D**
S28	0	S2()S1(5N)(S3 OR S5)
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S33	2	S21 (S) S32
S34	**1**	**S33 NOT (S27 OR S30)**

27/6/1 (Item 1 from file: 16)
07762768 Supplier Number: 64911755 (USE FORMAT 7 FOR FULLTEXT)
The Century Club.
August, 2000
Word Count: 19946

27/6/2 (Item 2 from file: 16)
07599334 Supplier Number: 63608936 (USE FORMAT 7 FOR FULLTEXT)
Equations predict drill-pipe fatigue in Middle East operations.
July 10, 2000
Word Count: 2760

27/6/3 (Item 3 from file: 16)
07174733 Supplier Number: 60903363 (USE FORMAT 7 FOR FULLTEXT)
Underreaming technologies provide array of applications.
Feb 21, 2000
Word Count: 2733

27/6/4 (Item 4 from file: 16)
07022453 Supplier Number: 58929868 (USE FORMAT 7 FOR FULLTEXT)
Coiled-tubing drilling technologies target niche markets.
Jan 10, 2000
Word Count: 3559

27/6/5 (Item 5 from file: 16)
06377825 Supplier Number: 54760472 (USE FORMAT 7 FOR FULLTEXT)
Drilling with casing promises major benefits.
May 17, 1999
Word Count: 3669

27/6/6 (Item 6 from file: 16)
06377823 Supplier Number: 54760470 (USE FORMAT 7 FOR FULLTEXT)
Total drills extended-reach record in Tierra del Fuego.
May 17, 1999
Word Count: 2765

27/6/7 (Item 7 from file: 148)
08597234 SUPPLIER NUMBER: 18108753 (USE FORMAT 7 OR 9 FOR FULL TEXT)
New bits, motors improve economics of slim hole horizontal wells.(Practical Drilling Technology)
March 11, 1996
WORD COUNT: 3237 LINE COUNT: 00258

27/6/8 (Item 8 from file: 148)
07709801 SUPPLIER NUMBER: 16545251 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Better practices and synthetic fluid improve drilling rates. (Practical Drilling Technology)
Feb 20, 1995
WORD COUNT: 3104 LINE COUNT: 00242

27/6/9 (Item 9 from file: 148)
07531132 SUPPLIER NUMBER: 15740763 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Training reduces stuck pipe costs and incidents. (Drilling Report)
Sept 19, 1994
WORD COUNT: 3160 LINE COUNT: 00253

27/6/10 (Item 10 from file: 148)
07280502 SUPPLIER NUMBER: 16026718 (USE FORMAT 7 OR 9 FOR FULL TEXT)
How to get a better bite from your circular saw blade. (includes related article)
May, 1994
WORD COUNT: 3216 LINE COUNT: 00252

27/6/12 (Item 12 from file: 148)
06774039 SUPPLIER NUMBER: 14669043 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Machining a new breed of aluminum: diamond is a cut above when it comes to machining aluminum-matrix composites. (includes related article on auto brake rotors)
Nov, 1993
WORD COUNT: 2269 LINE COUNT: 00179

27/6/13 (Item 13 from file: 148)
06497968 SUPPLIER NUMBER: 14152830 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Coiled tubing ... operations and services. (oil well drilling)(part 14)
April, 1993
WORD COUNT: 6303 LINE COUNT: 00509

27/6/14 (Item 14 from file: 636)
01964855 Supplier Number: 43494265 (USE FORMAT 7 FOR FULLTEXT)
DOE Invites Proposals for 1993 SBIR Program
Dec, 1992
Word Count: 2864

27/6/15 (Item 15 from file: 148)
06181380 SUPPLIER NUMBER: 13244140 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Field development technology: where it is, where it's going; Exxon R&D executive talks about industry's downhole and operational accomplishments and how we can meet new technical challenges.
Nov, 1992
WORD COUNT: 5170 LINE COUNT: 00433

27/6/16 (Item 16 from file: 148)
05914586 SUPPLIER NUMBER: 12456091 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Slim hole drilling proven in remote exploration project. (Total Exploration's oil and gas exploration project in Gabon)
June 22, 1992
WORD COUNT: 4384 LINE COUNT: 00342

27/6/17 (Item 17 from file: 148)
05912023 SUPPLIER NUMBER: 12416435 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Technical research converges on ways to drill deviated wells at peak efficiency. (offshore oil well drilling)
April, 1992
WORD COUNT: 4742 LINE COUNT: 00386

27/6/18 (Item 18 from file: 148)
05850785 SUPPLIER NUMBER: 12142275 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Coiled tubing used for slim hole re-entry. (includes related article)
Feb 17, 1992
WORD COUNT: 3000 LINE COUNT: 00231

27/6/19 (Item 19 from file: 148)
05774891 SUPPLIER NUMBER: 11833493 (USE FORMAT 7 OR 9 FOR FULL TEXT)
The all-composite aircraft: fact or fiction?
Jan 9, 1992
WORD COUNT: 2948 LINE COUNT: 00238

27/6/21 (Item 21 from file: 636)
01596206 Supplier Number: 42409091 (USE FORMAT 7 FOR FULLTEXT)
CERAMIC MATERIALS INDUSTRY ANALYSIS: NEW INDUSTRIAL DIAMOND AND CBN

TECHNOLOGIES AND MARKETS
Oct, 1991
Word Count: 583

27/6/22 (Item 22 from file: 148)
05122323 SUPPLIER NUMBER: 10513907 (USE FORMAT 7 OR 9 FOR FULL TEXT)
New life from old oil wells. (horizontal drilling)
Feb, 1991
WORD COUNT: 3663 LINE COUNT: 00287

27/6/23 (Item 23 from file: 148)
05227710 SUPPLIER NUMBER: 11283858 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Mineral Exploration. (review of international mineral exploration activities in 1990)(includes related articles on instrumentation, services and exploration drilling)
Annual, 1991
WORD COUNT: 20068 LINE COUNT: 01585

27/6/25 (Item 25 from file: 148)
02975109 SUPPLIER NUMBER: 04446205 (USE FORMAT 7 OR 9 FOR FULL TEXT)
At SPE exhibition in New Orleans: latest in equipment and services on display. (Special Report on Society of Petroleum Engineers 1986 Exposition)
Oct 6, 1986
WORD COUNT: 5900 LINE COUNT: 00505

27/6/26 (Item 26 from file: 148)
02836342 SUPPLIER NUMBER: 04129303 (USE FORMAT 7 OR 9 FOR FULL TEXT)
New tools change cutting economics.
Feb 7, 1986
WORD COUNT: 2488 LINE COUNT: 00200

27/3,K/11 (Item 11 from file: 16)
DIALOG(R)File 16:Gale Group PROMT(R)

03128650 Supplier Number: 44267783 (USE FORMAT 7 FOR FULLTEXT)
Unique Properties of Diamond and CBN Materials Drive Market Growth
Surface Modification Technology News, v3, n12, pN/A
Dec, 1993
Language: English Record Type: Fulltext
Document Type: Newsletter; Trade
Word Count: 223
... cubic boron nitride (CBN) into important industrial materials. Diamond, diamond-like, and CBN films and coatings have become available in the form of tool inserts, wear parts, prosthetic devices, audio speakers, X -ray windows, and heat sinks. In addition, several diamond-coated products are being applied to advanced electronic and optical systems.
The industry uses a range...
...of diamond and CBN to plasma chemical vapor deposition for diamond and CBN films and coatings . Diamond and CBN product technologies include different forming methods such as electroplating, resin and metal bonding , and vitrification. Brazing technologies are also used for single- crystal or polycrystalline products.
According to...
...more than 350 companies in four classifications. First are companies that supply raw diamond, CBN, **polycrystalline diamond (PCD)**, and polycrystalline CBN (PCBN) materials. Next are those companies that use the

raw materials...

27/3,K/20 (Item 20 from file: 636)
DIALOG(R)File 636:Gale Group Newsletter DB(TM)
(c) 2001 The Gale Group. All rts. reserv.
01622117 Supplier Number: 42490612 (USE FORMAT 7 FOR FULLTEXT)
INDUSTRY ANALYSIS:NEW BCC STUDY EXAMINES VAST POTENTIAL OF THE DEVELOPING INDUSTRIAL DIAMOND AND CBN TECHNOLOGY INDUSTRY
Optical Materials & Engineering News, v2, n3, pN/A
Nov, 1991
Language: English Record Type: Fulltext
Document Type: Newsletter; Trade
Word Count: 1062
TEXT:
...and high-end precision cutting and machining operations. Diamond, diamond-like and CBN films and coatings are now entering the commercial market for applications including: coated tool inserts, wear parts, **prosthetic devices**, audio speakers, x-ray windows, optical coatings , and heat sinks. Diamond-coated products are now emerging as devices for a variety of future advanced electronic and optical...
... boron nitride, and plasma-enhanced chemical-vapor deposition (CVD) for diamond and CBN films and coatings . Diamond and CBN product technologies are characterized by different forming methods such as electroplating, resin and metal bonding , and vitrification. Brazing technologies also have been adopted for single crystal or polycrystalline products. The...
...**products for 1990, 1991, and 1996. The figures present the market shares of diamond and polycrystalline diamond (PCD) products, CBN and polycrystalline CBN (PCBN) products, and the film markets.**
U.S. markets...
...important shift toward expanding utilization of these products.
Diamond, diamond-like, and CBN films and coatings are now entering the commercial markets of coated tool inserts, wear parts, **prosthetic devices**, audio speakers, X-ray windows, and heat sinks. Diamond coatings are under investigation for a number of advanced electronic and optical applications. These applications, at...
...and Markets - Diamond and CBN Products; PCD and PCBN Products; Diamond, Diamond-Like and CBN Coatings and Thin-Film Products. Price of the report is $2,950. A copy of the...

27/3,K/24 (Item 24 from file: 47)
DIALOG(R)File 47:Gale Group Magazine DB(TM)
(c) 2001 The Gale group. All rts. reserv.
03483092 SUPPLIER NUMBER: 09332570 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Diamond: glittering prize for materials science. (Molecule of the Year)(includes information about runners-up) (Cover Story)
Guyer, Ruth Levy; Koshland, Daniel E., Jr.
Science, v250, n4988, p1640(4)
Dec 21, 1990
CODEN: SCIEAS DOCUMENT TYPE: Cover Story ISSN: 0036-8075
LANGUAGE: ENGLISH RECORD TYPE: FULLTEXT
WORD COUNT: 4500 LINE COUNT: 00357
... drop significantly with the optimization of CVD technology.
Applications. A few diamond-based and diamond-coated products are already in use commercially - x-ray windows in electron microscopes, strong abrasion -resistant industrial tools, and diaphragms for tweeters in stereo speakers - but these represent only a...

...degrees] C.
Diamond single-crystal diamond films are needed for diamond semiconductors; **for other applications polycrystalline diamond films are adequate**. For example, abrasion -resistant tools are coated with this type of film. Industry faces a different sort of challenge with regard to...
...lenses to make them scratch-proof, nonreflecting, and permeable to light. **Because diamond films are wear -resistant, they might be fashioned into efficient, low-friction , unlubricated bearings for machinery and prosthetic devices**. A megaproject that may be in the offing is the production of diamond films...
...a million carats of diamond film.
In addition to the production of diamond films and coatings , free-standing diamond materials are being fabricated. Diamond nozzles have been cast for use in...desirable substrates for some application of diamond films, and so an understanding of what promotes bonding is critical. For some applications, epitaxial growth is required, whereas in other cases the substrate...
...of the [C.sub.60] molecule immediately brings to mind several possible applications - as catalytic surfaces and as capsules for transporting small molecules through the body, as do vesicles and viruses...
...poorly with other substrates and may, like their precursor graphite, be effective lubricants; if their surfaces can be modified (for example, with hydrocarbon chains), new forms of organic molecules could be...
Homestake Gold Mine in South Dakota. From these underground measurements, the "solar neutrino problem" has surfaced : only a third or a fourth of the number of neutrinos expected on the basis...
...the neutrinos were indeed coming from the sun. This year, two gallium-based detectors (the joint Soviet-American SAGE detector and the Italian Gallex detector) are joining the search for solar neutrinos. The gallium detectors can detect lower energy neutrinos and thus...
...are then used to remove the liquid from the gel in such a way that surface tension is not created: the fluid enters a supercritical state (gas and liquid are physically...regions of the brain.
Twinkling tweezers. Sperm that are too weak to penetrate the protective coat around an egg may soon be helped by laser beams. Femtosecond laser pulses can make...

27/3,K/27 (Item 27 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB

02335799 SUPPLIER NUMBER: 03822846 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Tomorrow's surface coatings - they're here today.
Irving, Robert R.
Iron Age, v228, p35(6)
June 21, 1985
ISSN: 0021-1508 LANGUAGE: ENGLISH RECORD TYPE: FULLTEXT
WORD COUNT: 3967 LINE COUNT: 00319
Tomorrow's surface coatings - they're here today.
TEXT:
Many of the new advanced coating systems are all pursuing the same goal: The gas turbine engine. If the system can...
... the gun itself has improved in efficiency and in its ability to deposit higher quality coatings . Also, new and improved coating materials have been developed. "We are meeting and beating the competition in the marketplace," he said.
Union Carbide has 10 detonation-gun coating centers in this

country, six in Europe and two in Japan.

One of many new...

...extensively on air and landbased gas turbine engines.

The process permits the deposition of denser coatings . They are 99 pct dense and are good for wear and corrosion resistance. Conventional plasma spray, he said, is only good for about 86 pct...

...are doing research for the adiabatic engine. Several Indy 500 cars had vacuum plasma sprayed coatings on their turbocharger housings and exhaust systems," Mr. Calosso explained.

Union Carbide is striking back...

...in the open. They have also been used successfully to deposit MCrAlY and thermal barrier coatings .

Dr. Tucker of Union Carbide believes that the argon-shrouded plasma spray torch is more...

...in this country, but it is being used in England by Rolls Royce to deposit coatings on the Pegasus engine."

The Cathodic Arc

William M. Mularie, general manager, Cat-Arc Division...

...The focus now is on the gas turbine engine. Its throwing power enables users "to coat around corners." Three systems are being readied for shipment--one to this country, one to...

...the most popular material. The system is competing mainly with the D-gun process. Other coatings include chromium carbide, another D-gun specialty. The Hastelloys and Tristelles are also promising.

Within...

...latter family is Tristelle TS-1, an iron-based material. It combines excellent corrosion and wear resistance at relatively low cost. It's actually an alloy with wear resistance similar to Stellite 6, but without the latter alloy's high (68 pct) cobalt...

...the seal area on inboard/outboard driveshafts which are exposed to salt water and sand abrasion . The material has also been applied to critical parts of the hydraulic rams used to...

...controlled explosions of a mixture of fuel and air.

Mr. Moskowitz also described an electroless coating process, known as Complate. It seems that this process is in operation at EC Technologies, a division of EC Industries, Inc., Emeryville, Calif. The process deposits coatings of silicon carbide.

A Diamond Coating

In another electroless process, Surface Technology, Inc., Princeton, N.J., is licensed by E.I. du Pont de Nemours & Co., Inc., Wilmington, Del., to put down **a polycrystalline diamond coating** . This coating goes on textile and other high speed machinery parts. A mil of nickel-phosphorous ...alloy is enough to hold the diamond particles throughout the matrix, not just on the surface .

The process is known as the composite diamond coating process. This method is competing against silicon carbide and aluminum oxide. To date, the parts are coated by Surface Technology "in-house."

This brings up the question as to whether to buy the equipment and coat the parts yourself or to rely on a third party to do the work for you. Some companies, like Applied Coatings International, Inc., Columbus, Ohio, are equipped to handle a variety of coating work. Applied Coatings , for example, is equipped to handle various physical vapor electrochemical and thermal spray deposition processes...

...engines, either. For example, it has also been used to apply Gator-Gard tungsten carbide coating onto gate valve trim components in the oil patch. Some of these gate valves are...

...is beginning to spread its wings and also move toward industrial

applications requiring relatively thick coatings , certainly thicker than the coatings implanted on silicon wafers which is where the technology started out 15 years ago.

According...

...hits."

Ion implantation also looks promising as a means of reducing pitting corrosion on the surfaces of ball bearings. Work done at the Naval Research Laboratory, Washington, indicates that several elements...

...in the aerospace industry because it circumvents the electron beam, physical vapor deposition types of coatings . Using the above, engine manufacturers had been paying $65 to $100 per airfoil for a 3 to 5 mil coating when they're sent out.

Equipment to do the electron beam work could run $2...

...VPS system was seen as a low cost alternative for applying the MCrAlY types of coatings ; the equipment can cost $1/4 million.

Seconding the Motion

At the International Conference on Metallurgical Coatings in April, at Los Angeles, D.S. Duvall of Pratt & Whitney, East Hartford, Conn., discussed a MCrAlY-type "vacuum" plasma sprayed coating which has demonstrated superior oxidation/corrosion resistance over state-of-the-art electron-beam physical vapor deposited MCrAlY coatings for turbine airfoils.

"Recent ceramic plasma-sprayed coatings ," he noted, "have been introduced which for the first time provide reliable thermal barriers on...

...To extend the life of components in the hot section of the engine, thermal barrier coatings are used. Thus, surface temperatures can be lowered by about 300[deg.] to 350[deg.] F. These coatings consist of an MCrAlY material as a bond coat and stabilized zirconia on top of that. Alloy Metals makes about 90 pct of all...

...for MCrAlY powders include environmental protection for airfoils, solid shrouds, abrasive blade tips and as bonding layers for thermal barrier coatings .

The top coating in thermal barrier coatings includes yttria stabilized zirconia and magnesia stabilized zirconium oxide powders.

Diesel engine manufacturers are now looking at thermal barrier coatings for piston heads. Most of the piston ring manufacturers use thermal spray coatings to add lubricity to the steel inserts on the piston rings. This is a wire-sprayed coating of molybdenum. Coatings based on chromium carbide are also under evaluation for this type of job.

The thermal barrier coatings are not only becoming more popular on diesel engine pistons, but they are seeing wider use on gas turbine combustion chambers, vanes and flame holders as well.

Triplex coatings are also being used. Here the coating consists of a transitional cermet layer or layers between the inner and outer layers. The...

...used.

The preferred ceramic constituent is zirconia, stabilized with either yttria or magnesia.

Thermal barrier coatings may also be used to protect extrusion dies and mandrels involved in the fabrication of high-temperature extrusions. A hardened tool steel die or mandrel is first coated with an undercoat of an 80 pct chromium, 20 pct nickel alloy. Oxide coatings of calcia stabilized zirconium are then applied on top of the 80 chrome, 20 nickel materials.

Thermal barriers of zirconium oxide are also used as thermal barrier coatings to protect against hot gases in exhaust systems, thus increasing the efficiency of the pistons...

...the yttria-stabilized zirconia overcoat.

The Universality of Plasma

At the International Conference on Metallurgical Coatings , E. Pfender of the University of ...workpiece and the gun."

This arc, he explained, "reverse sputter cleans" the workpiece before the coating is applied. "It not only cleans the oxide and other contaminants from the surface ," he pointed out, "but also creates a chemically active surface leading to a highly adherent coating ."

Low pressure plasma spraying has been used at Chromalloy for the last nine years. Five...

...handled by the process is the restoration, using nickel-base IN-738 powder, of partially eroded airfoils and leading edges on heavey industrial turbine blades and vanes.

Another example is gas path seal segments of flying turbines made from cobalt-base MAR-M509 material.

"The repair coatings exhibit very high density (greater than 99 pct) and are free from oxide inclusions," Mr. Sickinger claimed.

Automation of plasma spraying was another topic of interest at the coatings conference. There are opportunities for the cost-effective overhaul of gas turbine engine components by...

...and plasma spraying. "In this system," he said, "different parts with different geometries requiring different coatings can now be grit blasted and plasma sprayed on the same line at will.

"This...

...and can store up to 40 programs in memory.

Akron Sandblasting Co., Canton, Ohio, is coating the outside diameters of boiler tubes for Cleveland Electric Illuminating, a coal-fired utility in...

...316 stainless steel using the Jet Kote II process. This is to protect against the erosion and corrosion from fly ash. Akron Sandblasting has coated over 2,000 sq ft of tubing to date.

TAFA Incorporated, a manufacturer of thermal spray equipment in Bow, N.H., has a joint venture with Cincinnati Milacron on the T.sup.3 robot. About six of these robotic...

...based control console for high production applications.

Metallurgical Bonds

Another subject of study is the coating -to-substrate tensile bond strength of plasma sprayed steel on steel substrates. At the Los...

...Center, East Hartford, Conn., pointed out that superior strength, high quality metallurgical bonds between the coating and the substrate can be achieved. These results were achieved using low pressure plasma spraying...

...heat treat/consolidation.

General Electric Co., Evendale, Ohio, had reported previously about a three-step coating , known as BC23, which was regarded as one of the most corrosion-resistant of all coatings in the physical vapor deposition family. The coating and procedure consisted of a CoCrAl coating followed by co-deposition of hafnium and aluminum and an electro-plated layer of platinum.

At the recent coatings conference, David J. Wortman of General Electric introduced a plasma-sprayed version of the BC23 coating , then compared the two coatings in their performance on the Navy's GTS Callaghan. The new coating was deposited by the argon-shrouded plasma spray process, using prealloyed CoCrAlHfPt powder.

The results...

...where low temperature hot corrosion is the main mode of corrosion, that the plasma-sprayed coatings sustained less attack.

Where thin films of ultra-clean cobalt-base alloys are required, why

...Allied's "ultra rapid solidification technology," these alloys exhibit high strength, hardness, and corrosion and wear resistance.

When pulverized and plasma sprayed, powders of these alloys retain 85 to 97 pct of "their amorphousness" and do not show the boride phase observed in coatings from atomized powders. These coatings can be made 99+ pct of theoretical density, thus forming a hard, corrosion-resistant layer.

An Allied spokesman contended that the plasma sprayed coatings tend to be cleaner and harder than coatings made by alternate atomization technologies. "The coatings give corrosion resistance somewhere between that of the as-cast ribbon and consolidated material," noted...

...be accompanied by mild heating of the substrate. The areas of interest are corrosion and abrasion resistance. One potential application is diffusion barriers on small electro-mechanical devices. Coatings at present are in the 1 mil area, but 10-mil coatings are being seriously considered.

"You cannot really splat cool on a bumper," said Kathleen Hays, supervisor, at Sandia's Cleaning and Coating Technology Division. "It would be possible to sputter a coating onto a bumper but only up to certain thicknesses. Plasma enhancement may be the way to go."

Merle Thorpe, the president of TAFA, discussed the coating of tubes in power plants and in black liquor recovery boilers in paper mills. "You...

...then made at a cost of $500 to $2,000 per sq ft."

"A sacrificial coating is another approach," he said. "We at TAFA use the two-wire arc spray process which does not heat the surface , yet provides a very superior bond. The material is a 45Cr-55Ni material. A coating of 0.020 in. will do it. Companies have applied the material and are now...

...In the National Materials Advisory Report, attention was drawn to the need to provide protective coatings to the inside diameters of pipes. One proposal suggests that pipe internals be coated by exploiting the radially symmetric pattern developed in the impingement zone of two oppositely directed...

...matters: "For example, industry at large would derive substantial benefits from applying advanced plasma sprayed coatings to conventional low-alloy substrate materials. In general, this will necessitate further development of robotics and associated hardware in order to apply overlay coatings to large, complex surfaces such as chemical processing vessels, storage tanks and pipe reactors.

"Efforts should also be made to adapt technology already established in Japan (automobile engine valves), western Europe (piston coatings) and the Soviet Union (catalyst coatings in diesels) to our own commercial internal combustion engines."

The NMAB report also recommended that...

...a single process.

Whatever the process, the main advantage of thermal spraying is that the coating properties can be tailored to suit the application. And, in this day and age, that...

DESCRIPTORS: Surfaces (Technology...Coating processes...Coatings industry

31/3,AB,K/1 (Item 1 from file: 16)
DIALOG(R)File 16:Gale Group PROMT(R)

02583412 Supplier Number: 43430762
A Bright Future Awaits the Makers Of Synthetic Diamonds, Scientists Say
Journal of Commerce, p6A
Nov 4, 1992
Language: English Record Type: Abstract

Document Type: Magazine/Journal; Academic Professional
ABSTRACT:
Netherlands: Scientists at the Dutch Univerity of Nijmegen have used chemical vapor deposition to produce synthetic diamonds more simply and cheaply, according to John Giling, researcher at the university. The new method uses hydrogen gas, a hydrocarbon such as methane and a microwave oven to heat the compounds to 3,992F. The gases are split into atoms and hydrocarbon fragments which settle on a surface and grow into a tight carbon lattice structure. The method could create diamonds of unlimited size, although it has currently only yielded **polycrystalline diamonds.** The diamonds can be used for semiconductors, which can withstand heat in jet engines better vs silicon. They can also be used for heart valves, nuclear reactor linings, satellite windows and **prosthetic hip joints** for humans. The market is expected to reach $1 bil/yr by 2000.

34/3,AB,K/1 (Item 1 from file: 636)
DIALOG(R)File 636:Gale Group Newsletter DB(TM)

04055001 Supplier Number: 53529333
SwRI's Diamond-Like Carbon Process.
Medical Materials Update, v5, n11, pNA
Dec, 1998
Language: English Record Type: Fulltext
Document Type: Newsletter; Trade
Word Count: 469
TEXT:
...**instances where biomedical applications involve friction and wear, such as is the case with artificial hip joints, diamond-like carbon is considered superior to polycrystalline diamond because exceptionally smooth coatings can be deposited.** The DLC coatings offered by Southwest Research Institute...

File 350:Derwent WPIX 1963-2000/UD,UM &UP=200107
File 344:CHINESE PATENTS ABS APR 1985-2001/JAN
File 347:JAPIO Oct 1976-2000/Jul(UPDATED 001114)
File 371:French Patents 1961-2000/BOPI 0052

Set	Items	Description
S1	5	AU="POPE B J"
S2	9	AU="GARDINIER C F"
S3	1	AU="VAIL M A"
S4	10	AU="TAYLOR J K"
S5	5	AU="DIXON R H"
S6	3	AU="POPE L M"
S7	9	AU="JENSEN K M"
S8	0	S1 AND S2 AND S3 AND S4 AND S5 AND S6 AND S7 AND S8 AND S9
S9	0	S1 AND S2 AND S3 AND S4 AND S5 AND S6 AND S7
S10	41	S1:S7
S11	4207	PROSTHETIC?
S12	1	S10 AND S11
S13	268361	JOINT OR JOINTS
S14	89950	SOCKET OR SOCKETS
S15	32043	DIAMOND?
S16	23	S13:S15 AND S10
S17	23	S12 OR S16
S18	23	IDPAT (sorted in duplicate/non-duplicate order)
S19	**23**	**IDPAT (primary/non-duplicate records only)**
S20	18	S10 NOT S17
S21	18	IDPAT (sorted in duplicate/non-duplicate order)
S22	**18**	**IDPAT (primary/non-duplicate records only)**

19/TI/1 (Item 1 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Superabrasive cutting tool manufacture for industrial machinery, involves pressing can assembly having polycrystalline powder to form chip breaking unit and sintering polycrystalline powder to form cutting tool

19/TI/2 (Item 2 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Earth-boring bit comprises cutting element support, and cutting elements with hard metal cylindrical bodies and convex cutting ends having recesses, with a layer of super-hard material on the cutting ends

19/TI/3 (Item 3 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Drilling insert for cutting subterranean formations

19/TI/4 (Item 4 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Drill bit for rock drilling or crushing - has a convex nose bonded to a shank with surface irregularities

19/TI/5 (Item 5 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Polycrystalline diamond cutter, for installation on a drill bit - comprises a cutting face, cutting edge, rear boundary and rake land, providing higher stiffness and enhanced resistance to drilling induced bending stress

19/TI/6 (Item 6 from file: 350)

DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Composite polycrystalline boron nitride or diamond and cemented carbide cutting tool - with material bonded over cylindrical or conical carbide projections extending from substrate surface

19/TI/7 (Item 7 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Composite cutting tool of polycrystalline diamond on Tungsten carbide substrate - with corner between abrasive face and edge honed to remove cracks and reduce failure rate

19/TI/8 (Item 8 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
High thermal conductive diamond material - by synthesising in CVD reactor to have specified thermal conductivity and grain size larger than about 15 microns

19/TI/10 (Item 10 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Polycrystalline diamond compacts (PDC) cutting elements for drag bits - stud type PDC cutter eliminating need to braze PDC wafer to tungsten carbide stud, with high differential thermal expansion cracks

19/TI/11 (Item 11 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Article formed of non- diamond particles - with chemically vapour deposited diamond infiltrated into the inter-particle voids, the CVD diamond having high thermal conductivity, etc.

19/TI/12 (Item 12 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
High thermal conductivity synthetic diamond materials and articles - having a thermal conductivity greater than 17 watts per cm per degree Kelvin

19/TI/13 (Item 13 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
High thermal conductivity CVD diamond film - has a large crystallite size and specific Raman spectrum properties

19/TI/14 (Item 14 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
High thermal conductivity fibre-reinforced diamond composite - prepd. by CVD of very high thermal conductivity diamond to infiltrate porous preform of diamond coated fibres

19/TI/15 (Item 15 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
High thermal conductivity synthetic diamond material - is deposited on a substrate in a two stage chemical vapour deposition process

19/TI/16 (Item 16 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Consolidation of diamond particles, non- diamond particles or mixts. with high thermal conductivity - by infiltrating a shaped compact of the particles with CVD diamond material

19/TI/17 (Item 17 from file: 350)

DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
High thermal-conductivity diamond material - obtd. by a microwave plasma CVD coating a substrate

19/TI/18 (Item 18 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
High thermal conductivity diamond composite material - comprises diamond and non- diamond particles infiltrated with CVD diamond

19/TI/19 (Item 19 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Healing cracks and fatigue flaws in sintered cemented carbide tools - by re-sintering before surface cracks form, under initial sintering conditions to more than double work life

19/TI/20 (Item 20 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Drill for printed circuit boards - comprises sintered carbide body in one end of transverse molecularly bonded insert of sintered diamond etc. to provide cutting edges

19/TI/21 (Item 21 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Printed circuit board drill - has tip with abrasive vein of diamond or boron nitride sintered in groove in cemented carbide blank

19/TI/22 (Item 22 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Heat sink high thermal conductivity substrate prodn. - by leaching graphite from diamond composite made from sintered combination of particles and flat

19/TI/23 (Item 23 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
High thermal conductivity substrate - having known electrical characteristics, formed from sintered diamond composites, useful as heat sink

19/7/9 (Item 9 from file: 350)
DIALOG(R)File 350:Derwent WPIX
(c) 2001 Derwent Info Ltd. All rts. reserv.
010642456 **Image available**
WPI Acc No: 1996-139410/199614
Prosthetic joint with surfaces coated with polished polycrystalline diamond - formed by different methods on abutting surfaces for reduced friction and person
Patent Assignee: US SYNTHETIC (USSY-N); DIAMICRON INC (DIAM-N)
Inventor: GARRICK R M; POPE B J
Number of Countries: 053 Number of Patents: 006
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
WO 9604862	A1	19960222	WO 94US12755	A	19941102	199614	B
AU 9510506	A	19960307	AU 9510506	A	19941102	199624	
EP 774931	A1	19970528	WO 94US12755	A	19941102	199726	
			EP 95901155	A	19941102		
US 5645601	A	19970708	US 94289696	A	19940812	199733	
			US 96631877	A	19960416		
JP 10503951	W	19980414	WO 94US12755	A	19941102	199825	
			JP 96507269	A	19941102		
US 6010533	A	20000104	US 96631877	A	19960416	200008	

US 97844395 A 19970418
Priority Applications (No Type Date): US 94289696 A 19940812; US 96631877 A 19960416; US 97844395 A 19970418
Cited Patents: 5082359
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
WO 9604862	A1	E	15	A61C-003/00	
Designated States (National): AT AU BB BG BR BY CA CH CZ DE DK ES FI GB GE HU JP KE KG KP KR KZ LK LT LU MD MG MN MW NL NO NZ PL PT RO RU SD SE SI SK TJ TT UA VN					
Designated States (Regional): AT BE CH DE DK ES FR GB GR IE IT LU MC NL OA PT SE					
US 6010533	A			A61F-002/34	Cont of application US 96631877 Cont of patent US 5645601
AU 9510506	A			A61C-003/00	Based on patent WO 9604862
EP 774931	A1	E		A61C-003/00	Based on patent WO 9604862
Designated States (Regional): AT BE CH DE DK ES FR GB GR IE IT LI LU MC NL PT SE					
US 5645601	A		6	A61F-002/30	Cont of application US 94289696
JP 10503951	W		17	A61F-002/30	Based on patent WO 9604862

Abstract (Basic): WO 9604862 A

Interfaces of load-bearing areas (146,136) of prosthetic joint, e.g. hip joint , are coated with thin layers (150,158) of polished polycrystalline diamond, in which diamond crystals have a common dia. range of pref. less than 100mm, esp. 0.001-1mm.

Pref., thickness of layer is less than 1000mm, pref. less than 1mm. Diamond compact is coated on the surfaces by a method selected from sintering, high temp. laser, chemical vapour deposition, electroplating and forming a matrix of high molecular wt. polyethylene.

ADVANTAGE - Significantly decreases load-bearing surface erosion and debris.

Dwg.2/2

Abstract (Equivalent): US 5645601 A

A prosthetic joint comprising: a pair of load-bearing surfaces forming the joint and disposed in sliding engagement relative to each other; and coating means disposed on each of the load-bearing surfaces to contact the coating means on the other load-bearing surface to facilitate sliding therebetween, the coating means comprising polycrystalline diamond .

Dwg.2/2a

Derwent Class: A96; D22; L02; M11; M13; P32; P61
International Patent Class (Main): A61C-003/00; A61F-002/30; A61F-002/34
International Patent Class (Additional): A61F-002/28; A61F-002/32; A61F-002/38; A61L-027/00; B24D-003/02; C23C-016/18

22/TI/1 (Item 1 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Antisense compounds which specifically hybridize with and inhibit human bcl-6 expression, useful for treating bcl-6 related disorders, and preventing or delaying inflammation or tumor formation

22/TI/2 (Item 2 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Novel antisense compound 8-30 nucleobases in length targeted to human fra-1 and which specifically hybridizes with and inhibits the expression of human fra-1, useful for modulating the expression of fra-1 in cells

22/TI/3 (Item 3 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Window or door structural frame element - where metal reinforcement housed in structure has protrusions shaped to engage structural element to take up clearance

22/TI/4 (Item 4 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Roller cutter earth-boring drill bit having superhard-faced cutting elements - with cutting ends of elements having parallel grooves for improved adhesion of facing

22/TI/5 (Item 5 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Portable, vehicular traffic safety control device - has footing members with horizontally extending walls connected to side panels and pavement engaging bottom surfaces on it and top horizontal surfaces adapted for engagement with approaching vehicle tyre

22/TI/6 (Item 6 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Mount assembly used with vibration transducer in industrial vibration analyser - has hand support component, probe for contacting machine point and forward retainer to urge probe into compressive contact with vibration transducer and transducer into compressive contact with forward mount portion contact surface

22/TI/8 (Item 8 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Identification system for sensing partic. broadcast satellite signal at antenna - has memory storing look-up table correlating satellite identification data, for number of satellites with programmer identification and-or uplink data from received signal

22/TI/9 (Item 9 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Time discrete digital reformattor for video information - has double throw switch connected to load one time discrete digital memory while second memory is being unloaded

22/TI/10 (Item 10 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Chemical modification of biologically active material haemoglobin - using reactor with main inlet and outlet, and inlets for reagent and quenching agent

22/TI/11 (Item 11 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Coating PVC substrates, esp. conveyor belts, with rubber - by applying a layer of uncured nitrile rubber adhesive

22/TI/12 (Item 12 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Target fabrication appts. for lasing at X-ray wavelengths - supplies e.g. neon to e.g. sodium substrate which is cooled so that neon condenses to form frozen layer

22/TI/13 (Item 13 from file: 350)

DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Cooling sterilised prod. by transferring to vacuum - to be degassed and cooled by vacuum evapn.

22/TI/14 (Item 14 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Machine monitoring system - has bar chart formed of linear array of LEDs and small, hand-held programmer

22/TI/15 (Item 15 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Water pressure operated drain clearing device - has flexible inverted cup and bulbous plug with water main connection for fitting into drain opening

22/TI/16 (Item 16 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Producing plasma for X-ray laser - using laser beam focussed onto target with channel defined by spaced blocks to ensure amplification

22/TI/17 (Item 17 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Solid woven conveyor belting mfr. - by subjecting carcass to alternating changes in direction while immersed in impregnant

22/TI/18 (Item 18 from file: 350)
DIALOG(R)File 350:(c) 2001 Derwent Info Ltd. All rts. reserv.
Stimulated emission device operative in the UV and soft X-ray regions - by producing population inversion and lasing by charge transfer

22/7/7 (Item 7 from file: 350)
DIALOG(R)File 350:Derwent WPIX
(c) 2001 Derwent Info Ltd. All rts. reserv.
010064246 **Image available**
WPI Acc No: 1994-331957/199441
Composite polycrystalline cutting element with improved fracture resistance - where cutting element is bonded to substrate of carbide and interface between substrate and polycrystalline layer is defined by surface topography with spaced protuberances and depressions
Patent Assignee: US SYNTHETIC CORP (USSY-N)
Inventor: FARR R J; GRAHAM K G; HARDY J W; POPE B J
Number of Countries: 001 Number of Patents: 001
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
US 5355969	A	19941018	US 9336540	A	19930322	199441	B

Priority Applications (No Type Date): US 9336540 A 19930322
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 5355969	A		8	E21B-010/46	

Abstract (Basic): US 5355969 A

A cutting element comprises: (a) a substrate with a support surface formed with alternating protuberances and depressions spaced-apart in radial direction from the centre where the bottoms of the depressions are concave (b) a polycrystalline material layer having a cutting surface and an opposed mounting surface, the mounting surface having depressions and protuberances complementary to an in contact with the protuberances and depressions of the support surface.

Also claimed is, cutting element comprises: (a) a substrate having

a perimeter, a central axis, and a support surface (b) the upwardly projecting deformities having tops and sides having intersection between when form radii of curvature (c) the downwardly projecting deformities having bottoms and sides having intersection between which form radii of curvature.

USE - A composite polycrystalline cutting element including a substrate with improved fracture and delamination resistance.

Dwg.3/8

Derwent Class: H01; Q49
International Patent Class (Main): E21B-010/46

File 348:EUROPEAN PATENTS 1978-2000/Jan W04
File 349:PCT Fulltext 1983-2001/UB=20010201, UT=20010118

Set	Items	Description
S1	4	AU="POPE BILL J"
S2	1	AU="POPE LOUIS MCCONKIE"
S3	5	AU="JENSEN KENNETH M"
S4	0	S1 AND S2 AND S3
S5	**8**	**S1:S3**

5/6/1 (Item 1 from file: 348)
01202815
METHOD FOR FORMING A SUPERABRASIVE POLYCRYSTALLINE CUTTING TOOL WITH AN INTEGRAL CHIPBREAKER FEATURE

5/6/2 (Item 2 from file: 348)
00881751
POLYCRYSTALLINE DIAMOND CUTTER WITH ENHANCED DURABILITY AND INCREASED WEAR LIFE

5/6/4 (Item 4 from file: 348)
00128038
Method of manufacturing a printed circuit board drill.

5/6/5 (Item 1 from file: 349)
00735671 **Image available**
METHOD FOR FORMING A SUPERABRASIVE POLYCRYSTALLINE CUTTING TOOL WITH AN INTEGRAL CHIPBREAKER FEATURE

5/6/6 (Item 2 from file: 349)
00530264 **Image available**
POLYCRYSTALLINE DIAMOND CUTTER WITH ENHANCED DURABILITY AND INCREASED WEAR LIFE

5/6/7 (Item 3 from file: 349)
00503956 **Image available**
POLYCRYSTALLINE DIAMOND CUTTER WITH INTEGRAL CARBIDE/DIAMOND TRANSITION LAYER

5/3,AB/3 (Item 3 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

00760977
PROSTHETIC JOINT WITH DIAMOND COATED INTERFACES
GELENKPROTHESE MIT DIAMANTBESATZ DER GRENZFLACHEN
ARTICULATION PROTHETIQUE POURVUE D'INTERFACES RECOUVERTES DE DIAMANTS
PATENT ASSIGNEE:
U.S. SYNTHETIC, (2109610), 744 South 100 East, Provo, UT 84606, (US),
(applicant designated states:

AT;BE;CH;DE;DK;ES;FR;GB;GR;IE;IT;LI;LU;MC;NL;PT;SE)
INVENTOR:
POPE, Bill, J. , 1866 North 1450 East, Provo, UT 84604, (US)
GARRICK, Richard, M., 1720 North 1450 East, Provo, UT 84604, (US
LEGAL REPRESENTATIVE:
Grunecker, Kinkeldey, Stockmair & Schwanhausser Anwaltssozietat (100721)
, Maximilianstrasse 58, 80538 Munchen, (DE)
PATENT (CC, No, Kind, Date): EP 774931 A1 970528 (Basic)
EP 774931 A1 981007
WO 9604862 960222
APPLICATION (CC, No, Date): EP 95901155 941102; WO 94US12755 941102
PRIORITY (CC, No, Date): US 289696 940812
DESIGNATED STATES: AT; BE; CH; DE; DK; ES; FR; GB; GR; IE; IT; LI; LU; MC;
NL; PT; SE
INTERNATIONAL PATENT CLASS: A61C-003/00; A61F-002/28; B24D-003/02;
C23C-016/18; A61F-002/30;
NOTE: No A-document published by EPO
LANGUAGE (Publication,Procedural,Application): English; English; English

5/3,AB/8 (Item 4 from file: 349)
DIALOG(R)File 349:PCT Fulltext

00408846
PROSTHETIC JOINT WITH DIAMOND COATED INTERFACES
ARTICULATION PROTHETIQUE POURVUE D'INTERFACES RECOUVERTES DE DIAMANTS
Patent Applicant/Assignee:
US SYNTHETIC
Inventor(s):
POPE Bill J
GARRICK Richard M
Patent and Priority Information (Country, Number, Date):
Patent: WO 9604862 A1 19960222
Application: WO 94US12755 19941102 (PCT/WO US9412755)
Priority Application: US 94289696 19940812
Designated States: AT AU BB BG BR BY CA CH CZ DE DK ES FI GB GE HU JP KE KG
KP KR KZ LK LT MG MN MW NL NO NZ PL PT RO RU SD SE SI SK TJ TT UA VN AT
BE CH DE DK ES GR IE IT LU MC NL PT SE BF BJ CF CG CI CM GA GN ML MR NE
SN TD TG
Publication Language: English
Fulltext Word Count: 2932
English Abstract
A prosthetic joint (108, 130) with polycrystalline diamond compact coated interfaces (150, 158) and a method for making the same are disclosed. The prosthetic joint (108, 130) has a diamond layer (150, 158) formed on at least one of the interacting, load-bearing surfaces of the joint (108, 130). The diamond layer (150, 158) adds resistance to damage from impacts and, when polished, gives the joint a low coefficient of friction, thereby increasing the life of the joint (108, 130). In accordance with one aspect of the invention, the diamond layer is formed of polycrystalline diamond compact having a common diamond particle diameter of less than 1 micron to further reduce friction.